DS3640/DS6024/DS8018/DS10014

Programmable DC Power Supply

User's Manual

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6F, NO. 248, SEC.3, PEI-SHEN RD., SHEN KENG HSIANG, TAIPEI HSIEN 222, TAIWAN, R.O.C.

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Important Safe-Operation Guidelines

Properly Preserve This User Manual: This Manual contains important graphical & literal interpretations regarding installations, maintenance and safety in operation, etc.

Qualified Professional Maintenance Personnel

- As stated in this User Manual, neither spare parts nor exclusive fine tuning is included inside this product; forbid user removing the outer cover of a product while using it. For any double or unclear thing in operation, please contact MOTECH or our agent's professional service personnel.
- While removing the outer cover to repair by the professional person, proper protection is still necessary to prevent people from getting an electric shock.
- Forbid repacking this product or its accessories; or it would cause danger to user and make the warranty failure.

Precautions on Normal Operation

- The recommended operation temperature of this product is 0- 40 degrees C, relative humidity 20- 80. Do not boot this product when the ambient temperature or humidity is beyond the one specified above, locating at a place filled with volatilized explosive gas, flammable liquid materials. Also, appropriately locate the cable that won't stumble on passengers walking along corridor or is exerted under external stress.
- To protect personal safety and warranty rights of product, advise the user to visually look over the integrality of the appearance of this product before electrifying and starting this product. If parts become flexible, strength sunken on outer casing, sharp angle or crack or under other flawed or damaged state, contact MOTECH or its agent.
- Avoid using the incomplete, damaged cable or cable not acquiring the safety permission defined by related enactments. To renew the cable or install additional extension cable, it should also select the cable material meeting the specification of this product.
- To operate this product, be sure that the protective earth connection of power is already linked firmly. This precaution sustains for the other

electrical equipment it collocates in operation to ensure personnel and equipment's safety.

- Suitable user of this equipment is one who can hold basic electrical idea and comprehend this User Manual in details.
- The power cable attached to this product meets with the related safety regulations and can secure operating safety under correct use. To pull power plug out of receptacle, user should hold the plug and pull it out. Directly pulling power cable would result in danger. At the instance of turning off power switch the residual electric charges in electric capacitors still might cause electrical shock to user. We recommend user to wait for five minute till the inner fan ceases, which means that the discharge process it finished.
- Before carrying on general maintenance and safeguarding, please shut off power supplied to this product, pull out the plug and cutting off the joined load. Use dry cloth to whisk or wipe off outer cover and cable; for safety concern, avoid using suds or organic solvent to clean this product.

※※※ Store/Move/Maintain/Handle ※※※

Storage

When this device is not in use, properly package it and store it on environment suitable for storage (if in a good preserving environment, the packaging process can be waived).

Freight

While moving this product, move it by using the original wrappings to pack this product in advance. If the wrapping material is lost, use an equivalent buffer material to replace it in packaging; and with external marks indicating “fragile & water-prevention”.

This product is sort of precise device; please try one's best to use qualified means of transport to transport it. And try one's best to avoid dropping or others that would jeopardize this product.

Maintenance

This product is free from any maintainable item for user normal user to maintain about. (except the one indicated in this Manual). When any abnormal condition happens to this product under user’s judgment, please contact us or our agent immediately. Never try to maintain this product by oneself that would cause unnecessary danger in consequence and which might cause even severe damage to this product.

Disposal

When the device in badly condition and can’t be used or repaired, please discard it according to your company disposal procedures or local legal procedures. Don’t discard arbitrary to avoid polluting environment.

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1. Preface

1.1 Products Outline

MOTECH DS3640/DS6024/DS8018/DS10014 is a programmable DC power supply with single output that offers the maximum power output up to 1440 watts (0 ~ 36V/40A or 0 ~ 60V/24A or 0 ~ 80V/18A or 0 ~ 100V/14.4A). With a 16-bit D/A, A/D converter embedded, DS3640/ DS6024/DS8018/DS10014 comes with the resolution of 1mV in voltage setting and 1mA in current setting. With the cascaded (series) or parallel connections of up to four (4) devices of DS3640/DS6024/DS8018/DS10014, it may be able to provide a maximum power output up to 5760 watts. When four (4) DS10014 are cascade connected, the maximum output voltage can reach up to 400V. When four (4) DS3640 are put in parallel connections, the output current can reach up to 160A. The feature of series/parallel connections makes DS3640/DS6024/DS8018/DS10014 more convenient and flexible for varies applications.

DS3640/DS6024/DS8018/DS10014 has provided a knob controller, numerical and function keys for users to manipulate this electronic instrument more easily and fast. Also, DS3640/DS6024/DS8018/DS10014 provides a memory space for user to store 10 settings that can be recalled directly. This feature offers an easy way to restore the application setting. In addition, users can use a program to control when to cut off the output. This feature provides an extra safety for burn in room and electroplating applications. DS3640/DS6024/DS8018/DS10014 also provides over voltage protection (OVP), over current protection (OCP), and over power protection (OPP) features used to keep the output voltage and current within the safety level preventing the target from the damage caused by the over current. The key lock feature is added to avoid accidentally wrong setting to the DS3640/DS6024/DS8018/DS10014. When the input power and the load change, the DS3640/DS6024/DS8018/DS10014 provides a stable output with the load and line regulation within 0.05% and the transient time less than 1 ms to maintain a very steady output. When in remote mode, DS3640/ DS6024/DS8018/DS10014 may output a new setting in 50 ms after receive a command. This quick response time may increase the throughput on the mass production lines.

1.2 Features

1) Output Voltage & Current

Voltage output range:	**0 ~ 36V (DS3640) / 0 ~ 60V (DS6024)**
	0 ~ 80V (DS8018) / 0 ~ 100V (DS10014)
Current output range:	**0 ~ 40A (DS3640) / 0 ~ 24A (DS6024)**
	0 ~ 18A (DS8018) / 0 ~ 14.4A (DS10014)
Power output range:	**0 ~ 1440W**

2) Digital knob controller, numerical keys and functions keys

The knob controller can be used to rapidly change the output voltage setting and simulate the surge of the voltage output. It successfully offers a good solution to the tests of triggering circuit. Numerical keys facilitate users making fast setting without withstanding the conventional VR analog simulation. Using function keys to switch modes makes the overall operation more humanizing and easy to deal with.

3) Precise voltage and current measurement

Besides the precise output, DS3640/DS6024/DS8018/DS10014 also offers the capacity of voltage & current measurement (read back) accurately that users may be able to save extra expense and space for extra measuring instruments.

4) Memory device and timer function

DS3640/DS6024/DS8018/DS10014 provides a memory space for users to save 10 settings. This feature makes users no need to hold and memorize too many settings in mind. They simply need to store the settings in DS3640/DS6024/DS8018/DS10014 hardware and restore the setting at any time. The DS3640/DS6024/DS8018/DS10014 has one (1) timer with the resolution of 1 second. The timers are used to time the outputs. When the timer counts down to zero the DS3640/DS6024/DS8018/DS10014 will automatically turn the output off. This feature is useful when the DS3640/DS6024/DS8018/DS10014 is providing power to the test object in a burn-in room. The programmable capability allow this equipment to run at a burn-in room that operator needs not to care about time setting points because this equipment will shut off output when the specific set time points reaches. It has covered the advantages of both safety and flexibility. DS3640/DS6024/DS8018/DS10014 will perform perfect control of time

and current resolution as entirely meeting customer's demanding.

5) OVP (over voltage protection), OCP (over current protection) and OPP (over power protection) and key lock functions

The over voltage protection (OVP), over current protection (OCP) and over power protection (OPP) features limit the maximum output current and voltage to avoid damages to the test objectives when doing experimentations in a laboratory. The key lock feature disables all keys except the CLR key. It prevents DS3640/DS6024/DS8018/DS10014 from the accidentally wrong setting and then avoids the damages to the target.

6) Series & parallel connection mode

The series-parallel connection mode of two or more units (maximum to 4 units) largely increases product's power-supplying capability. Under the parallel connection mode of four DS3640 the maximum output is 36V/160A; and under the cascaded connection mode of four DS10014, the maximum output is 400V/14.4A. Power supplied under these two modes reach up to 5760 watts output that can meet most electric experiments' demands.

7) Multi-units series connection mode

Computer can connect to system through USB interface. RS485 interface can be used to connect 31 units at most. It can save GPIB interface card and GPIB wiring expense and simplify the connection control.

2. Specification

DS3640/DS6024 Specifications		
Output Rate	DS3640	DS6024
Output Voltage	0~36V	0~60V
Output Current	0~40A	0~24A
Output Power	1440W	1440W
Line Regulation		
Voltage	≦4mV	≦6mV
Current	≦4mA	≦4mA
Load Regulation		
Voltage	≦8mV	≦8mV
Current	≦8mA	≦7mA
Ripple and Noise (20Hz-20MHz)		
Normal Mode Voltage	≦5mVrms/≦60mVpp (Load ≧0.5%)	≦6mVrms/≦70mVpp (Load ≧0.5%)
Normal Mode Current	≦90mA	≦70mA
Resolution		
Programming	1mV/1mA	1.5mV/1mA
Readback	1mV/1mA	1.5mV/1mA
Programming Accuracy (% output+offset)		
Voltage	0.05%+10mV	0.05%+15mV
Current	0.05%+10mA	0.05%+8mA
Readback Accuracy (% output+offset)		
Voltage	0.05%+10mV	0.05%+15mV
Current	0.05%+10mA	0.05%+8mA
Transient Response Time	≦1mS	≦1mS
Efficiency	80%	80%
OVP Adjustment Range	2~38V	3~64V
OVP Accuracy	200mV	300mV

Command Response Time	50mS	50mS
Power Factor	0.99 (Full load)	0.99 (Full load)
Remote Sense Compensation	2V	2V
Rising Time at Full Load	≦15mS	≦20mS
Rising Time at No Load	≦15mS	≦20mS
Falling Time at Full Load	≦15mS	≦20mS
Falling Time at No Load	≦1000mS	≦1000mS
Standard Interface	USB	
Standard Accessories	Power Cord、Terminal Block for Rapid Plug Connector	
Optional Interface	LAN, GPIB	
Optional Accessory	RS-485 Cable	
General		
AC Line Rated Input Voltage	100~240VAC (Full load)	
Tolerance/Variation in Voltage	-15% ~ +10% (10% power de-rating mode when voltage under 95 Vac)	
Rated Frequency	47Hz~63Hz	
Maximum Rated Input Power	1700VA	
Temperature Ratings(O)	Operation (0 °C ~ 40 °C)	
Temperature Ratings(S)	Storage (-10 °C ~ 70 °C)	
Dimensions(W*H*D)	420*43.6*432mm	
Weight	9kg	

DS8018/DS10014 Specifications		
Output Rate	DS8018	DS10014
Output Voltage	0～80V	0～100V
Output Current	0～18A	0～14.4A
Output Power	1440W	1440W
Line Regulation		
Voltage	≦8mV	≦10mV
Current	≦4mA	≦4mA
Load Regulation		
Voltage	≦10mV	≦12mV
Current	≦6.5mA	≦6mA
Ripple and Noise (20Hz-20MHz)		
Normal Mode Voltage	≦7mVrms/≦80mVpp (Load ≧0.5%)	≦8mVrms/≦80mVpp (Load ≧0.5%)
Normal Mode Current	≦50mA	≦40mA
Resolution		
Programming	2mV/1mA	2.5mV/1mA
Readback	2mV/1mA	2.5mV/1mA
Programming Accuracy (% output+offset)		
Voltage	0.05%+20mV	0.05%+25mV
Current	0.05%+7mA	0.05%+6mA
Readback Accuracy (% output+offset)		
Voltage	0.05%+20mV	0.05%+25mV
Current	0.05%+7mA	0.05%+6mA
Transient Response Time	≦1mS	≦1mS
Efficiency	≧80%	≧80%
OVP Adjustment Range	4～85V	5～105V
OVP Accuracy	400mV	500mV
Commond Response Time	50mS	50mS

Power Factor	≧0.99 (Full load)	≧0.99 (Full load)
Remote Sense Compensation	2V	2V
Rising Time at Full Load	≦25mS	≦30mS
Rising Time at No Load	≦25mS	≦30mS
Falling Time at Full Load	≦25mS	≦30mS
Falling Time at No Load	≦1000mS	≦1000mS
Standard Interface	USB	
Standard Accessories	Power Cord、Terminal Block for Rapid Plug Connector	
Optional Interface	LAN, GPIB	
Optional Accessory	RS-485 Cable	
General		
AC Line Rated Input Voltage	100～240VAC (Full load)	
Tolerance/Variation in Voltage	-15%～+10% (10% power de-rating mode when voltage under 95 Vac)	
Rated Frequency	47Hz～63Hz	
Maximum Rated Input Power	1700VA	
Temperature Ratings(O)	Operation(0℃～40℃)	
Temperature Ratings(S)	Storage (-10℃～70℃)	
Dimensions(W*H*D)	420*43.6*432 mm	
Weight	9kg	

Features of DS3640/DS6024/DS8018/DS10014:

- Graphical LCD easy to read
- Compact, high efficiency and high power density
- 40A output connector for fast connecting
- Numerical & function keys for friendly setting
- Store and recall settings (up to 10 sets)
- Timer (1 sec ~ 100 hours)

- Programmable (SCPI command only), with up to 10 sets of program and maximum 150 steps in total
- Extra 5V/1A output, suitable for fixture circuit without the need of additional power
- Precise voltage and current measurement
- OVP, OCP and key-lock function
- Series & parallel connection modes are applicable
- Series connection mode. Max. is up to 31 units (using RS485 interface)
- Mean measuring time per measurement is 50mSec
- Standard USB interface
- Optional interfaces:GPIB, LAN

3. Cautions Before Using

3.1 Check and Confirm Accessories before Using

As to safeguard your rights, after receiving this product, please confirm the items received in accordance with the ones listed below:

1. The appearance of the products is without scratch or other damages.
2. Standard parts as shown in Attachment 1 (Parts List) of Chapter 9.

※ If there is any situation as stipulated above found, please inform us as soon as possible and we would correct it for you immediately.

3.2 Operation Instructions

This PRODUCT is a precise instrument. In order to prevent it from improper operation causing the damage, be sure to read and comprehend this User Manual. And in order to maintain accuracy, send it to perform factory's calibration once per year.

3.3 Ambient Environment

1. Do not locate or operate this product in an environment with dust, vibration, or corrosive gas and do not explore this product directly to the sunlight. Operate it in an environment with temperature 0~40^{o}C & relative humidity 20%~80%. Pause the operation when ambient temperature is over 40^{o}C; undo the operation only after the ambient temperatures drops to the acceptable temperature range. Operating temperature over the above range would damage the host part.
2. This product is equipped with one blow-out type cooling fan on the back board and three suck-in cooling fans on inner side of front board. Note on good ventilation near the cooling fans and keep the boards with a space above 10cm away from wall. To maintain a good accuracy operation, do not block the ventilation holes spaces.
3. Although this product is designed to well-block the noise from the AC power source, still, try one's best to operate it in a background environment with low power noise and ensure that the system earth is made substantially. If the power noise is unavoidable, please install a power filter.

3.4 Storage

The storage temperature range of this product is within -10ºC ~ 70ºC and R.H. should be within 80% without moisture condensing. If not operating this product for a long time interval, pack it with original packaging or similar one and put it in a dry place without hit by direct sunlight.

3.5 Power-line voltage

Rated AC power source connected to this product is within 100V~240V (refer to the Product Specification for details). Before connecting to external power source, be sure that the power switch is in OFF state and look over the suitability of power cable (including the extension line) being as compatible to the rated voltage/current and sufficient circuit capacity and then, connect the cable tight.

Warning:

The power cable attached with this product is safety certified for this product operating in rated range. To change a cable or add a extension cable, be sure that it can meet the rated range of this product; any misuse of additional cable would jeopardize user's rights and interests of warranty service.

3.6 Fuses

This product is a switching mode power supply. The fuse installed inside is a multi-barrier protection design of hardware. It is hardly be breakdown under normal operation status. In case the fuse is melted to break, it shows another malfunction exists that causes the fuse to break. In such case, it is suggested to send this product back for services.

Warning:

To sustain user's rights of warranty service and avoid misconnection that would cause jeopardy from it, we don't recommend user to dismantle the casing and change fuse by oneself.

3.7 Preheating Time

All movements of this product will activate at the same time when the power is on. However, to reach the specified equipment accuracy, please preheat it for at least 30 minutes.

3.8 End test

When testing is over and not to be restarted for a while, or when this product isn't under use, or user needs to leave during operation, be sure to turn the power switch on the panel to OFF position as to turn off the power. After power switch is turned to OFF position, the inner fans will still run for a few seconds to carry on the inside electric capacitor discharge process per safety code requirement. Once the discharge process is complete, this product will make automatic shut-down in response.

3.9 Cautions in Operation

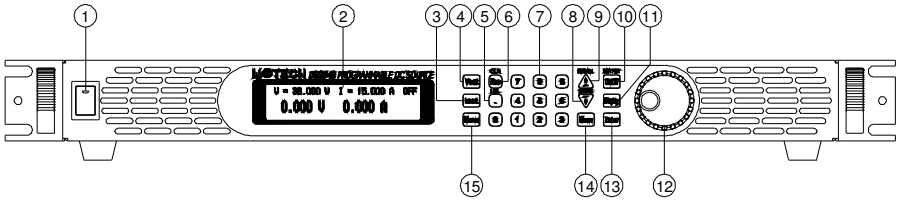
A. While under cascaded connection mode, each DS3640/DS6024/DS8018/ DS10014 shall be in power-on state and output shall be "ON". In case there is any one DS3640/DS6024/DS8018/DS10014 is in power-off state or output is "OFF", the associated output current will flow over the output bypass diode of the power-off unit and burn it out.

B. While under parallel connection mode, the output voltage of each DS3640/DS6024/DS8018/DS10014 shall be set to equal. If the setting value of each unit is not the same, the higher output voltage will feed back to the smaller unit and destroy its inner parts.

C. When the AC input voltage is lower than the full-load voltage which is 100 Vac, DS3640/DS6024/DS8018/DS10014 will activate an inner overtemperature protector and cut off the output in response. To ensure that the entire test process can be complete smoothly, confirm that the input AC voltage is within the specified range.

4. Panel Demonstration

4.1 DS3640/DS6024/DS8018/DS10014 Panel



4.1.1 Front Panel

(1) Power switch:

Please consult the "Cautions before use" before turnning on power switch.

(2) Display:

192*32 Graphic LCD Module

(3) Current setting (Iset):

Press (Iset) to set up the current limit.

(4) Voltage setting (Vset):

Press (Vset) to set up the output voltage.

(5) Dot/Local (•):

This button is applied as a decimal point. Or push this button after entering REMOTE online state to resume into LOCAL mode (unit-operation mode). Or press this button to release after entering LOCK page.

(6) ESC/CLR (Esc):

Press this button to clean up numerical setting or jump to the previous page.

(7) Numerical keys (0) ~ (9):

They are used to fast input the voltage or current value or choose the setting option in Menu page.

(8) Down/Right/Store (↓):

This key is a compound key for the following three functions:

Down: In "Menu Setting" status, use this "Down" key to move cursor to the next item.

Right: Under "Output" status, use this key to move cursor right.

Store: Under Memory Setting status, use this key to store setting to the selected memory set.

(9) Up/Left/Recall (↑):

This key is a compound key for the following three functions:

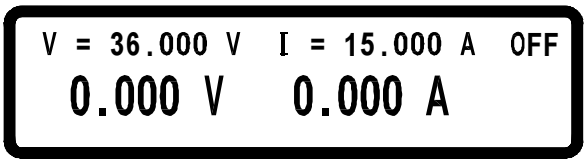
Up: In "Menu Setting" status, use this "Down" key to move cursor to the up item.

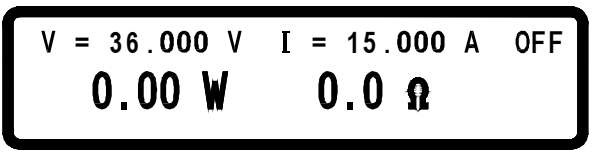
Left: Under "Output" status, use this key to move cursor left.

Recall: Under Memory Setting status, use this key to recall setting from the selected memory set.

(10) Display (Display):

In "Menu Setting" page, press (Display) to return to main page or switch the display to show the power and the loading resistance





(11) Output (On/Off):

Control the On/Off of the output power.

(12) The knob controller:

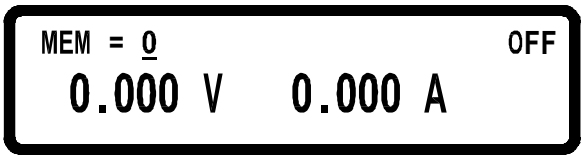
Use this tuner to adjust voltage or current (press (Enter) first to let cursor display first). It is an option item in Menu Setting.

(13) Enter (Enter):

This key is the confirming key of current or voltage setting value; or press (Enter) under output status to dynamically adjust voltage (at CV mode) or current (at CC mode).

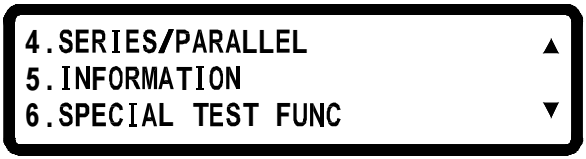
(14) Mem (Mem):

Press this key to enter the memory device status page. Users can then use the numerical key or knob to select the target memory set to save or recall the configuration by pressing the STORE or RECALL key. Ten sets are available in selection.



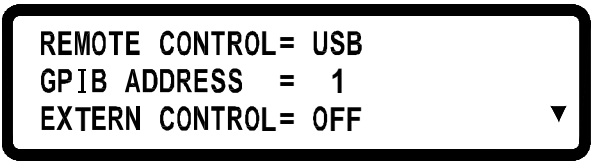
(15) Menu (Menu):

Use this key to make system parameters setting. There are eight (8) major items under operation. Users may press (↑), (↓), and the numerical keys to enter the corresponded setting page.
Press (↑) or (↓) key to jump to one of the following three pages:



1. SYSTEM SETTING:

Pressing (1) key in the first page of Menu Setting can enter the following "SYSTEM SETTING" page.

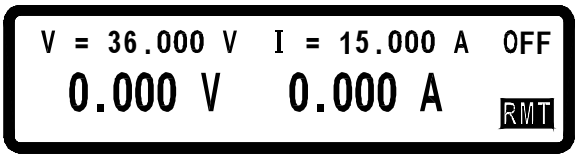


REMOTE CONTROL: Choose the transmission interface (USB/GPIB/ETHERNET)

***USB interface is a virtual COM port, baud rate is 57600bps**

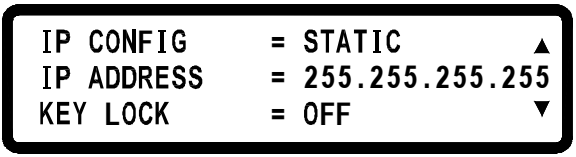
Data bit :8
Parity check :none
Stop bit :1
Please download USB Driver on http://www.motech.com.tw.

*If entering the Remote mode, screen will present RMT symbol as shown in the following picture.



GPIB ADDRESS: Set up GPIB ADDRESS (1~31)

EXTERN CONTROL: Set up the external control to voltage control (VOLT 0~10V or 0~5V), resistance control (RES 0~5K) or off (OFF).



IP CONFIG: **STATIC:** users input IP address

DHCP : IP address is assigned by the server.

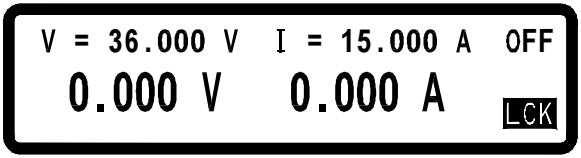
IP ADDRESS: If IP CONFIG is set to STATIC, users shall enter the IP addresses here.

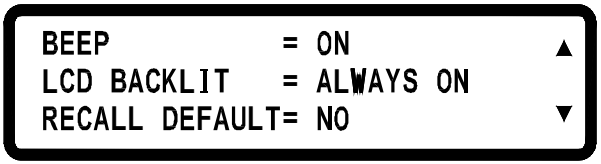
If IP CONFIG is set to DHCP, the assigned IP address will be shown here.

KEY LOCK: While exit the setting page after enable KEY LOCK, all keys except the (•) key that can disable KEY LOCK status will be deactivated.

*Simultanously presses both (↑) and (↓) keys in the main page can also unlock keys.

*While entering KEY LOCK state, screen will present LCK symbol as shown in the following picture.

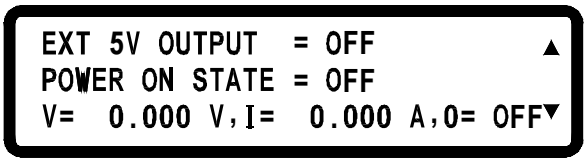




BEEP: Turn the Buzzer ON/OFF

LCD BACKLIT: Set the backlight of the LCD to always ON or OFF after 1/5/10/30 minutes

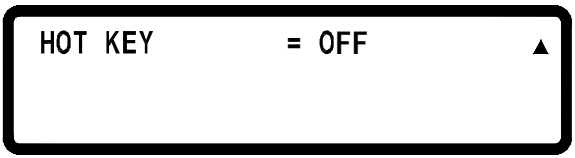
RECALL DEFAULT: Restore the manufactuer default setting



Ext 5V OUTPUT: Turn the extra 5V power (on the rear panel) ON/OFF

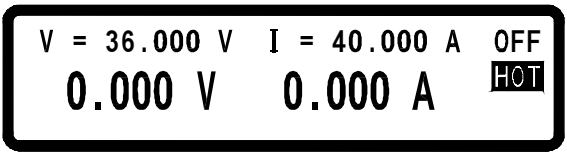
POWER ON STATE: Users may be able to set the output state after the power is on. When OFF is selected, DS3640/DS6024/DS8018/DS10014 will do nothing after power on. If LAST is selected, then after power on, DS3640/DS6024/

DS8018/DS10014 will be set to the last output state when power off. If USER (user defined) is selected, it will jump to next line to make setting of output voltage, current, and output state. Then after power on, DS3640/DS6024/DS8018/DS10014 will set up the output to ON/OFF and the output voltage and current according the settings here.



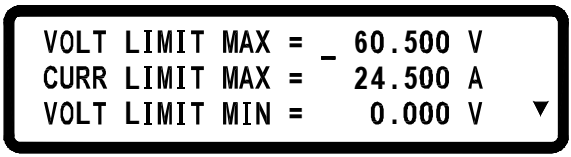
HOT KEY: Set the HOT KEY functioin ON/OFF, if the HOT KEY function is ON, User can using 0 – 9 number keys to recall the voltage and current setting value in the memory that have been saved.

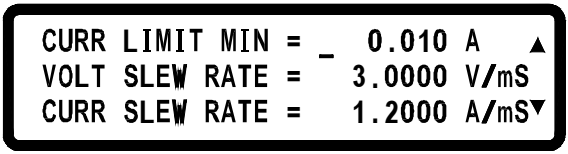
*If entering the HOT KEY mode, screen will present RMT symbol as shown in the following picture.

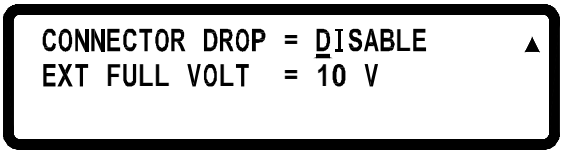


2. OUTPUT SETTING:

Press (2) in the first page of Menu Setting to enter OUTPUT SETTING page.







VOLT LIMIT: Limit of the output voltage setting

CURR LIMIT: Limit of the output current setting

VOLT SLEW RATE: Voltage ascending/descending slope
(3640:0.01 ~ 2.4V/mS)
(6024:0.01 ~ 3V/mS)
(8018:0.01 ~ 3.2V/mS)
(10014:0.01 ~ 3.3V/mS)

CURR SLEW RATE: Current ascending/descending slope
(3640:0.01 ~ 2.5A/mS)

(6024:0.01 ~ 1.2A/mS)

(8018:0.01 ~ 0.72A/mS)

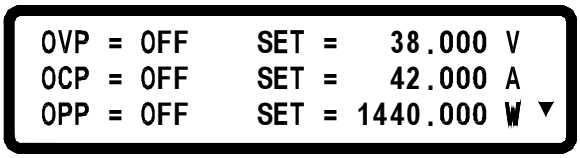
(10014:0.01 ~ 0.48A/mS)

CONNECTOR DROP： Turn on/off the connector drop calibration function

EXT FULL VOLT: External tuning setting with full-scale voltage (10V / 5V)

3. PROTECTION SETTING (PROTECTION)

Press (3) key in the first page of Menu Setting to enter PROTECTION page.



OVP: turn on/off the overvoltage protection

SET: set up the overvoltage protecting point.

OCP: turn on/off the overcurrent protection

SET: set up the overcurrent protecting point.

OPP: turn on/off the overpower protection

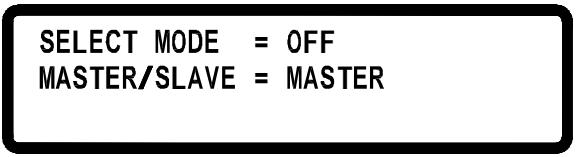
SET: set up the overpower protecting point.

CV TO CC: Enable/disable the protection of the conversion from CV to CC mode

CC TO CV: Enable/disable the protection of the conversion from CC to CV mode

4. SERIES/PARALLEL SETTING

Press (4) in the second page of Menu Setting to enter SERIES/PARALLEL page.

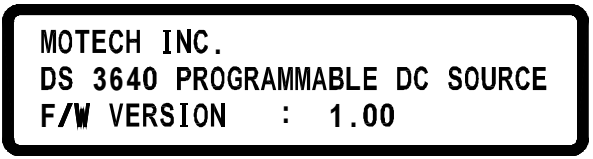


SELECT MODE: Choose the Series/Parallel mode.

MASTER/SLAVE: Refer to **Sec 5.8:Series/Parallel Setting** for the detailed setting procedure of MASTER/SLAVE mode.

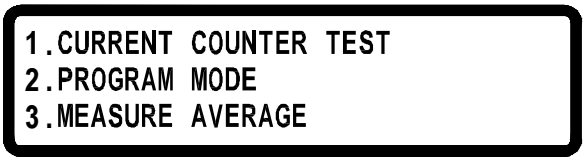
5. INFORMATION

Press (5) in the second page of Menu Setting to enter INFORMATION page.

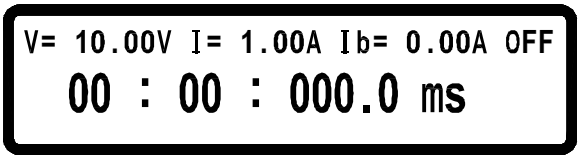


6. SPECIAL TEST FUNC

Press (6) in the second page of Menu Setting to enter SPECIAL TEST FUNCTION page.



6.1 CURRENT COUNTER TEST: Press (1) to enter the CURRENT COUNTER TEST page.

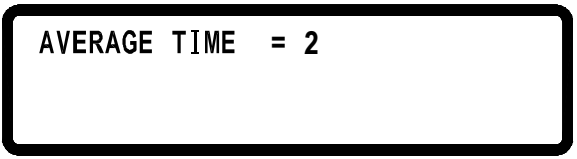


Refer to **Sec 5.10:Current Counting** for the detailed setting procedure.

6.2 PROGRAM MODE:Press (2) to enter the PROGRAM MODE page.

Before running the program, user needs to input the programs through the USB or GPIB interface into DS3640/DS6024/ DS8018/DS10014. Users may save 10 programs (program number 1 through 10) in the hardware and recall here in this Program Mode page by selecting the program number and then pressing (On/Off) to execute the program.

6.3 MEASURE AVERAGE:Press (3) to enter the MEASURE AVERAGE page.



AVERAGE TIME: Set the measure average time.

7. TIMER CONTROL

Press (7) in the third page of Menu Setting to enter TIMER CONTROL page.

TIMER: Turn on/off TIMER function.

TIME: Set up OUTPUT ON time (Max:999Hr 59Min 59Sec)

8. CALIBRATION

Press (8) in the third page of Menu Setting to enter CALIBRATION page. Users shall enter the password and then access to the calibration procedures.

8.1 Equipment Requirments

1. 5 1/2 DVM (HP34401A)
2. Shunt for Current Calibration **(100A/10** mΩ)

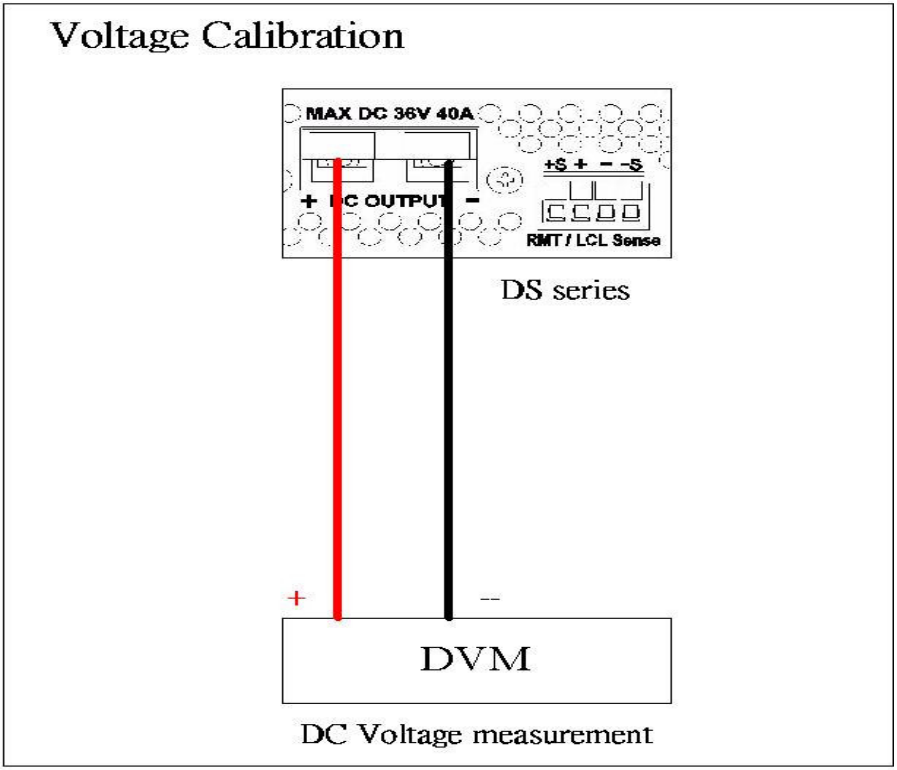


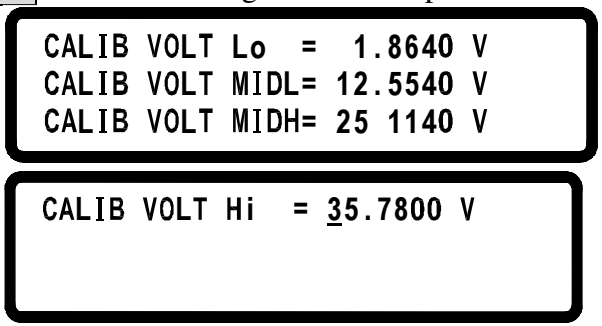
Figure 1

8.2 Calibration Items and Procedures

8.2.1 VOLTAGE CALIBRATION

A. Connect DS3640 output terminal to DVM (as shown in Figure 1). Then, select DVM at DC volatage measurement and turn on DS3640. Once entering main page, press MENU and select "8.Calibration" and key in password "13579" to enter the following calibration main page (Items 1、2、3)：

B. Press 1 to access Voltage calibration procedure



C. According to voltage value displayed on DVM, please fill in with the corresponding function and press ENTER. If any DVM read-back value at each voltage function does not fit with the following table, please inspect the hardware.

DS 3640

Function	Setting	Range of Transformation Value
Lo	1.8V	1.5 ~ 2.0 V
MIDL	12V	10 ~ 13 V
MIDH	24V	21 ~ 25 V
Hi	32.4V	31 ~ 34 V

DS 6024

Function	Setting	Range of Transformation Value
Lo	3V	2.4 ~ 3.6 V
MIDL	20V	18 ~ 22 V
MIDH	40V	36 ~ 44 V
Hi	57V	53 ~ 61 V

DS 8018

Function	Setting	Range of Transformation Value
Lo	4V	3.6 ~ 4.4 V
MIDL	26V	23.5 ~ 28.5 V
MIDH	53V	48 ~ 58 V
Hi	76V	69 ~ 83 V

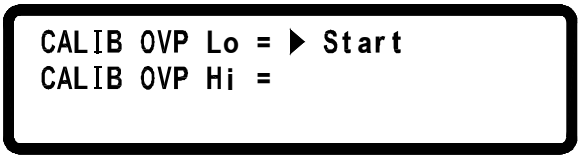
DS 10014

Function	Setting	Range of Transformation Value
Lo	5V	4.5 ~ 5.5 V
MIDL	33V	29.7 ~ 36.3 V
MIDH	66V	59 ~ 72 V
Hi	95V	85 ~ 104 V

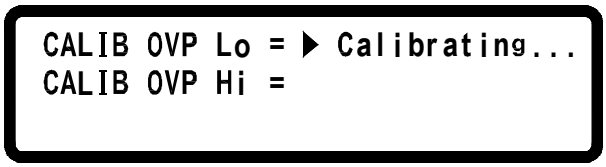
D. When pressing ENTER at Hi function, the calibration value will be stored in FLASH and returned to calibration main page (Items 1、2、3).

8.2.2 OVP CALIBRATION

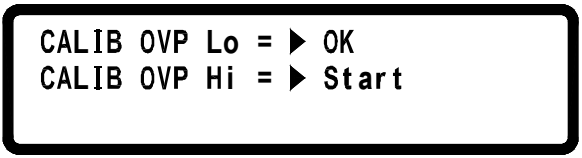
A. Press 2 in the calibration main page to enter OVP calibration page.



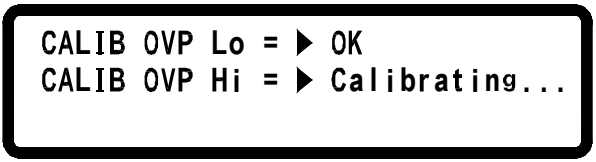
B. Press ENTER to access OVP calibration procedure at Low function.



C. Jump to Hi function when completed.



D. Press ENTER to access OVP calibration procedure at High function.



E. After completed, calibration value will be stored in FLASH and returned to calibration main page (Items 1、2、3)

F. If calibration is not completed in 10 seconds after starting, please inspect OVP circuit.

8.2.3 CURRENT CALIBRATION

A. Connect two output terminals of DS3640 to two ends of current shunt, and connect DVM to the sensor of current shunt to measure DC voltage as shown Figure 2. Press 3 to enter current calibration page.

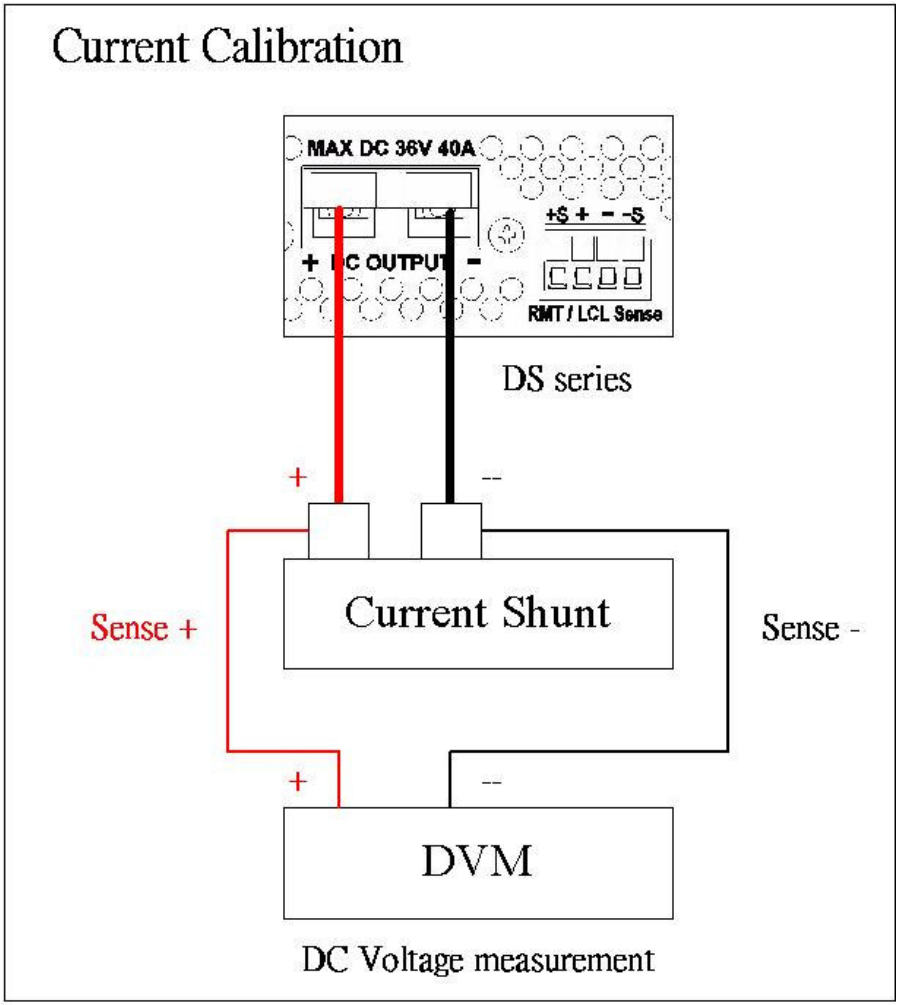
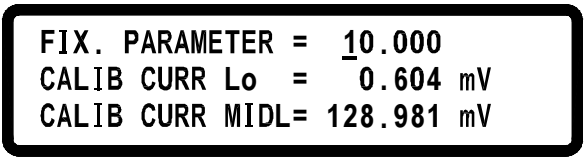
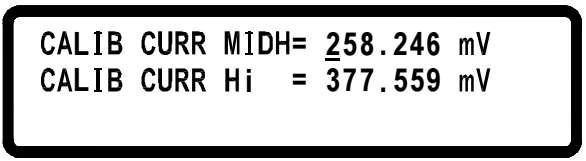


Figure 2

B. First, input transformation parameter (resistance of current shunt, mΩ) of current measurement fixture.

According to voltage value shown on DVM, fill in with the corresponding function and press ENTER key.





C. Please inspect the hardware, if the current value is inconsistent with the value in the tolerance error table after the value of calibration function is transformed to actual current value.

DS 3640

Function	Setting	Range of Transformation Value
Lo	0.1A	0 ~ 0.5 A
MIDL	13A	11 ~ 14 A
MIDH	26A	23 ~ 27 A
Hi	38A	34 ~ 39 A

DS 6024

Function	Setting	Range of Transformation Value
Lo	0.06A	0 ~ 0.5 A
MIDL	7.8A	6.6 ~ 9 A
MIDH	15.6A	14 ~ 17.2 A
Hi	22.8A	21 ~ 24.6 A

DS 8018

Function	Setting	Range of Transformation Value
Lo	0.045A	0 ~ 0.1 A
MIDL	5.9A	5.3 ~ 6.5 A
MIDH	12A	10.8 ~ 13.2 A
Hi	17A	15.3 ~ 18.7 A

DS 10014

Function	Setting	Range of Transformation Value
Lo	0.03625A	0 ~ 0.1 A
MIDL	4.7A	4.2 ~ 5.2 A
MIDH	9.5A	8.55 ~ 10.45 A
Hi	13.7A	12.33 ~ 15.07 A

D. The calbriation value will be stored in FLASH after pressing ENTER at Hi function.

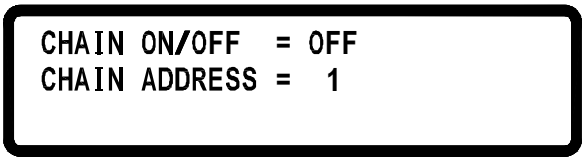
8.2.4 CONNECTOR DROP CALIBRATION (Not available)

8.2.5 EXTERNAL VOLTAGE CALIBRATION (Not available)

8.2.6 EXTERNAL CURRENT CALIBRATION (Not available)

9. Series Connection Control Setting (CHAIN)

Press (9) in Menu setting page to enter CHAIN SETTING page.

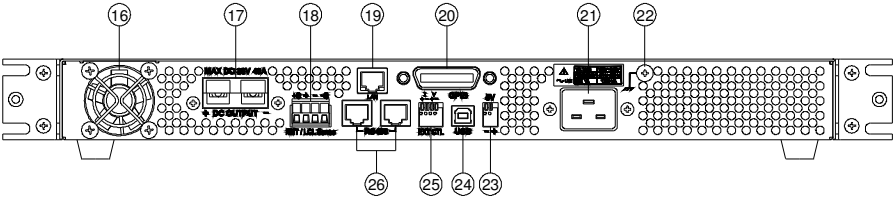


CHAIN ON/OFF : **On/Off Series Connection Mode**

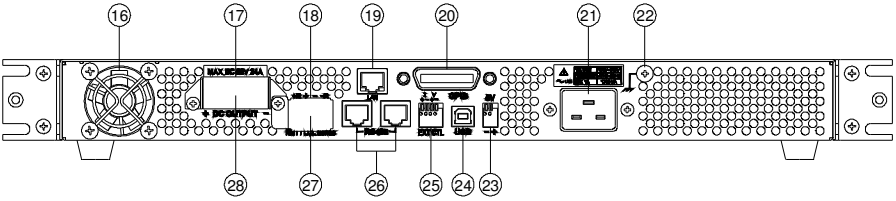
CHAIN ADDRESS : **Setting Address (1 – 31)**

For the detailed setting information, please refer to **Sec. 5.12 SERIES CONNECTION FUNCTION.**

4.1.2 Rear Panel



Rear Panel of DS3640



Raer Panel of DS6024/DS8018/DS10014

(16) Cooling fans:

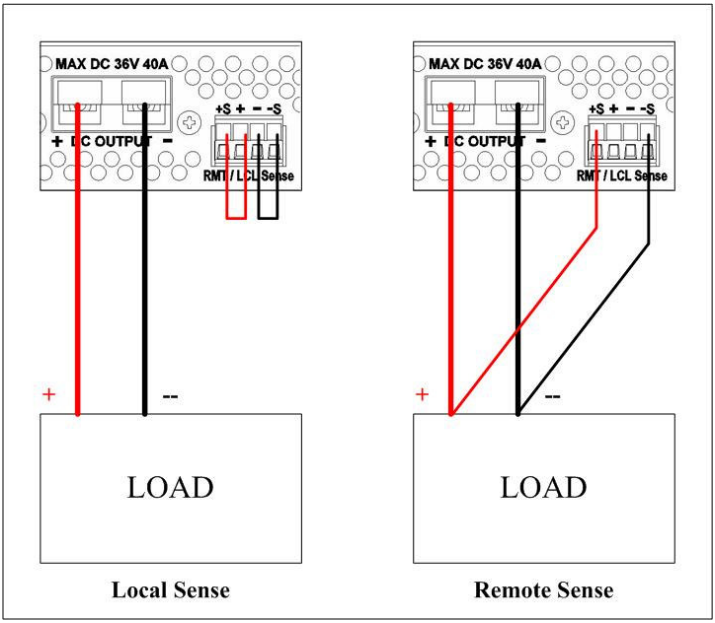
Automatically adjust fan's rpm according to the internal tempeture. This is a wisdom design.

(17) Power output terminal:

Please pay attention to the correct polarities when doing the connections.

(18) RMT/LCL Sense:

When Remote sense is selected, the wire connection shall be as follows (shown in the figure below):positive sense (+S) and positive lead (+) of the DC output are connected to the positive end (+) of the device, whereas negative sense (-S) and negative lead (-) of the DC output are connected to the negative end (-) of the device under test. This connection will compensate the voltage dropped due to the current flow through the long power wires (the maximum compensating voltage is 2V).



When Local sense is selected, the wire connection shall be as follows (shown in the figure above):positive sense (+S) is connected to the positive lead (+) and negative sense (-S) is connected to the negative lead (-), whereas the positive lead (+) of the DC output is connected to the positive end (+) of the device and the negative lead (-) of the DC output is connected to the negative end (-) of the device under test. When this sensing mode is selected the power wires from the DC ouput leads to the device under test shall be as short as possible.

(19) LAN (optional):

The ETHERNET interface connector

(20) GPIB (optional):

The GPIB interface connector

(21) AC power input:

The power receptacle is for power source within 100Vac ~ 240Vac.

(22) Earthing point:

Used for earth ground connection.

(23) 5V/1A Output:

DS3640/DS6024/DS8018/DS10014 offers an extra output that the constant output voltage is 5V and the maximum output current is 1 amperes. This extra power supply can be switched on or off in the System Setting menu.

(24) USB :

It is the USB interface connector.

(25) EXT CTL:

DS3640/DS6024/DS8018/DS10014 offers the capability of setting the output voltage/current by adjusting an external input voltage/resistance. The range of the external input voltage is 0 ~ 10Vdc or 0 ~ 5V which is corresponding to the output voltage of 0 ~ 36V for DS3640 and 0 ~ 60V for DS6024 and 0 ~ 80V for DS8018 and 0 ~ 100V for DS10014 and corresponding to the output current of 0 ~ 40A for DS3640 and 0 ~ 24A for DS6024 and 0 ~ 18A for DS8018 and 0 ~ 14.4A for DS10014. The range of the external resistance is 0 ~ 5K ohm which is corresponding to the output voltage of 0 ~ 36V for DS3640 and 0 ~ 60V for DS6024 and 0 ~ 80V for DS8018 and 0 ~ 100V for DS10014 and corresponding to the output current of 0 ~ 40A for DS3640 and 0 ~ 24A for DS6024 and 0 ~ 18A for DS8018 and 0 ~ 14.4A for DS10014.

(26) RS485:

While at series-parallel connection or multi-unit series connection, RS485 interface can be used for communications and synchronize signals between master and slavers.

(27) Protection shield of the RMT/LCL Sense connector (DS6024/DS8018/DS10014):

WARNING:

When the RMT/LCL Sense is not activated and/or not used, the protection cover shall be keeping in shielded state, do not dismantle it that might get an electric shock.

(28) Protection shield of the output leads (DS6024/DS8018/DS10014):

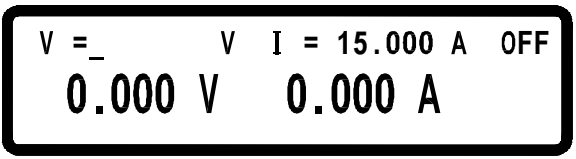
WARNING:

This PRODUCT is designed meeting safety code and has passed the related qualification test. To assure user the consistency of safety, user should, after equipping DC output cable according to field condition, follow the Manual's suggestion to install the fixing sheets. In case no output cable is connected, close the protection shield and fasten the screws in so as to protect user from getting an electric shock or other hazards.

5. Operation Interpretation

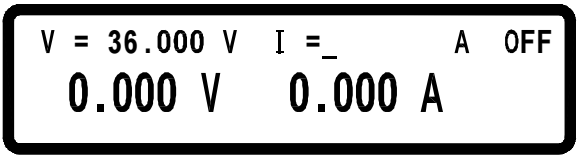
5.1 Voltage Setting

Press (Vset) and set the output voltage by press numerical keys directly, and then press (Enter) to confirm it and complete the setting.



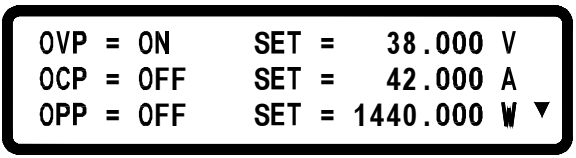
5.2 Current Setting

Press (Iset) and set the output current by press numerical keys directly and then press (Enter) to confirm it and complete the setting.



5.3 Over-voltage Protection OVP

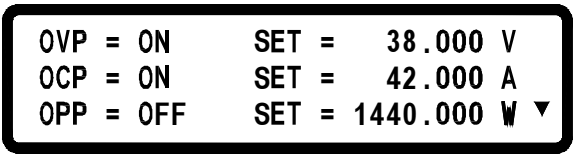
Press (Menu) to enter the Configuration page and press (3) to enter the PROTECTION setting page. Then, using the knob to set OVP to ON and press (Enter) to confirm it. Now the cursor will move to the value setting for the OVP on the right hand side. Enter the OVP value here by press the numerical keys.



5.4 Over-current Protection OCP

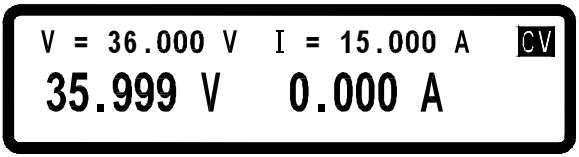
Press (Menu) to enter the Configuration page and press (3) to enter the PROTECTION setting page. Then, using the knob to set OCP to ON and press

(Enter) to confirm it. Now the cursor will move to the value setting for the OCP on the right hand side. Enter the OCP value by press the numerical keys.



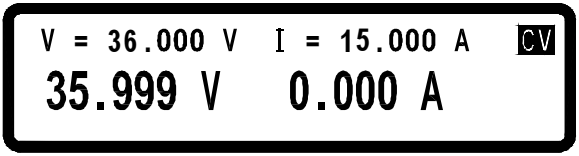
5.5 Voltage Output

After the voltage, current and protection point settings, press (On/Off) to output voltage. User shall be able to recognize the setting values and the actual output values from the LCD.



5.6 Voltage Output Controlled by Knob controller

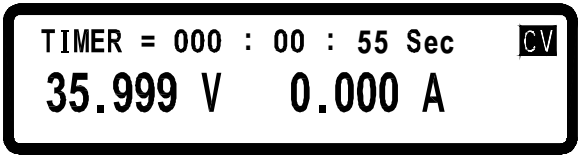
When the output is ON, user can may still increase or decrease the output voltage by turnning the knob controller. The procedure is:press (Enter) and cursor appears in response; press (↑) or (↓) to move the cursor to the digit that change will make and turn the knob to increase or decrease the output voltage. The changes of the voltage seting and the output voltage can be observed concurrently.



5.7 Timer Function

When the “Timer Setting” function at item 7 of system parameters is ON, it will activate the timer. After time setting is made, return to the main page. After setting up the output current & voltage and press (On/Off) to output, the screen now will show the countdown of Timer that when it counts down to zero,

system will turn off the output automatically.

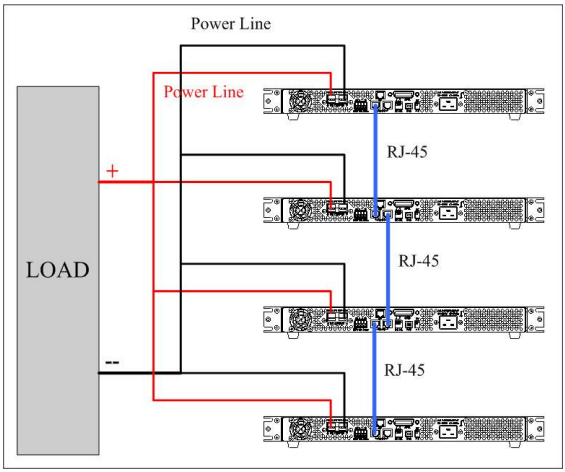


5.8 Make Series (Cascade)/Parallel Setting

The DS3640/DS6024/DS8018/DS10014 uses the series/parallel mode (4 sets in maximum) that can apparently improve the power supplying capability. Under the 4-set parallel mode of DS3640 units, the combines unit can offer 36V/160A power output. And under the 4-set cascading mode of DS10014 units, the combined unit can offer 400V/14.4A output. Note that you cannot perform both parallel and series mode at the same time. Series connection will be off once Series (Cascade)/Paralled connection function is turned on.

5.8.1 Parallel Connection Setting

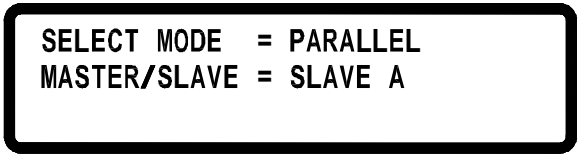
While connecting four sets of DS3640/DS6024/DS8018/DS10014 in parallel, the wiring is shown in the following figure:



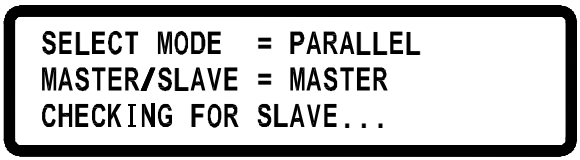
After wiring is complete, select one DS3640/DS6024/DS8018/DS10014 as the Master and the other three are Slave A, B and C. After the DS3640/DS6024/ DS8018/DS10014 is set to the Master, it will start searching for all Slaves that are connected to the Master. Therefore, in order to reach the control status, user

must set up the Slaves before the Master is set.

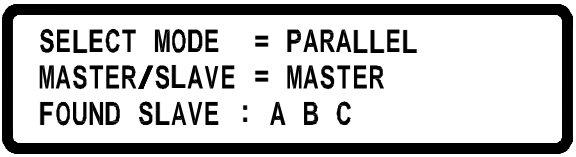
To set a DS3640/DS6024/DS8018/DS10014 to the slave mode, press (Menu), (↓), and (4) in the main page to enter the series/parallel setting option. And then select the parallel mode by turning the knob (SCPI command is "PS:MODE PARALLEL") and then press (Enter) to confirm. It will continue to the next line for the MASTER/SLAVE selection. Turning the knob to select SLAVE A (SCPI command is "PS:TYPE SLAVEA") for the DS3640/DS6024/DS8018/DS10014 and press (Enter) to confirm the setting. Using the same procedure to set up SLAVE B and C for another two (2) DS3640/DS6024/DS8018/DS10014 as graphically demonstrated below.



To set the master unit, press (Menu), (↓), **and** (4) in the main page to enter the series/parallel setting option. And then use the knob to select the parallel mode (SCPI command is "PS:MODE PARALLEL") and press (Enter) to confirm. It will continue to the next line for the MASTER/SLAVE selection. Use knob again to select MASTER (SCPI command is "PS:TYPE MASTER") and then press (Enter) to confirm. After it is confirmed as the Master the DS3640/DS6024/DS8018/DS10014 will start searching for all Slaves, as graphically demonstrated below.



If wiring is correct, screen will appear:



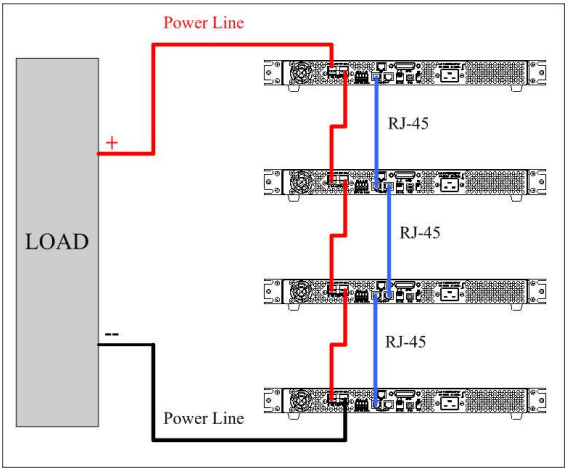
After receiving the control order from the Master, all Slaves will be locked on the SLAVE page that all keys except (•) are disabled so that slaves can not be operated by press keys except controlled by the Master as graphically demonstrated below.

Once the Master and Slave settings are done, users can then operate the Master only to set up the output voltage and current.

To release from this operation mode (parallel operation mode in this example), press (•) (LCL) to access to the series/parallel setting page and turning the knob to select OFF for series/parallel selection to leave the series or parallel operation mode and back to the local operation mode that the DS3640/DS6024/DS8018/DS10014 can be controlled by press the keys again. It shall not change the operation mode while DS3640/DS6024/DS8018/DS10014 is in output state or it will cause the Master's communication failure and display error message.

5.8.2 Cascade Setting

While connecting four sets of DS3640/DS6024/DS8018/DS10014 in cascade, the wiring is shown in the following figure.



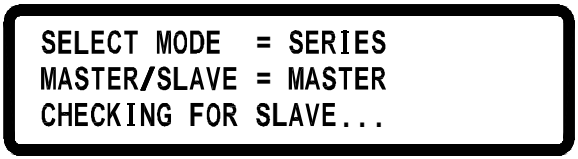
After wiring is complete, select one DS3640/DS6024/DS8018/DS10014 as the Master and the other three as the Slave A, B, and C. After the DS3640/DS6024/DS8018/DS10014 is set to the Master, it will start searching for all Slaves that are connected to the Master. Therefore, in order to reach the control status, user must set up the Slaves before the Master is set.

To set a DS3640/DS6024/DS8018/DS10014 to the slave mode, press (Menu), (↓), and (4) in the main page to enter the series/parallel setting option. And then select the SERIES mode by turning the knob (SCPI command is "PS:MODE SERIES") and then press (Enter) to confirm. It will continue to the next line for the MASTER/SLAVE selection. Turning the knob to select SLAVE A (SCPI command is "PS:TYPE SLAVEA") for the DS3640/DS6024/DS8018/DS10014 and press (Enter) to confirm the setting. Using the same procedure to set up SLAVE B and C for another two DS3640/DS6024/DS8018/DS10014.

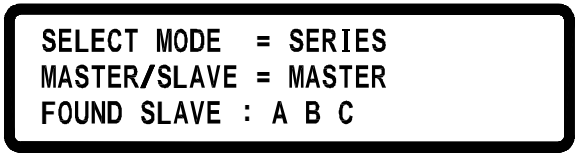
```
SELECT MODE   = SERIES
MASTER/SLAVE = SLAVE A
```

To set the master unit, press (Menu), (↓), and (4) in the main page to enter the series/parallel setting option. And then use the knob to select the

series mode (SCPI command is “PS:MODE SERIES”) and press (Enter) to confirm. It will continue to the next line for the MASTER/SLAVE selection. Use knob again to select MASTER (SCPI command is “PS:TYPE MASTER”) and then press (Enter) to confirm. After it is confirmed as the Master the DS3640/DS6024/DS8018/DS10014 will start searching for all Slaves, as graphically demonstrated below.



If wiring is correct, screen will appear:



After receiving the control order from the Master, all Slaves will be locked on the SLAVE page that all keys except (•) are disabled so that slaves can not be operated by press keys except controlled by the Master as graphically demonstrated below.

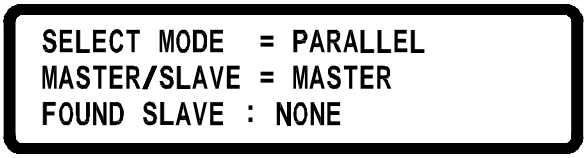
Once the Master and Slave settings are done, users can then operate the Master only to set up the output voltage and current.

To release from this operation mode (series operation mode in this example), press (•) (LCL) to access to the series/parallel setting page and turning the knob to select OFF for series/parallel selection to leave the series or parallel operation mode and back to the local operation mode that the DS3640/DS6024/DS8018/DS10014 can be controlled by press the keys again. It shall not change the operation mode while DS3640/DS6024/DS8018/DS10014

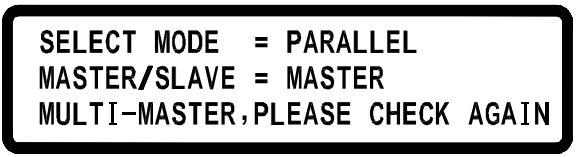
is in output state or it will cause the Master's communication failure and display error message.

5.8.3 Error Message of Series/Parallel Connection

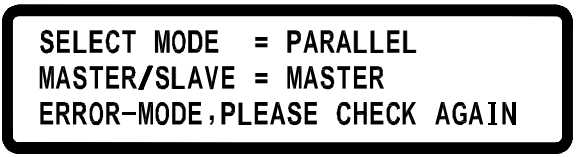
If RS485 wiring is wrong or the signal is not correct, Master will display the following message in the page of searching Slaves:



If more than one Master being set in the series/parallel operation mode, the following message will be displayed.



If one of the DS3640/DS6024/DS8018/DS10014 is set to different series/ parallel operation mode, screen will appear the following message.

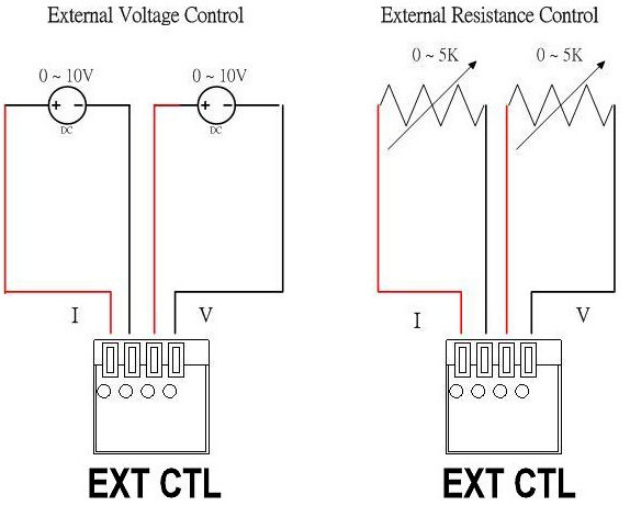


After finishing setting procedure, if the Master cannot have a communication with one of the three (3) Slaves, Master will present the following error message (Slave A in this example).

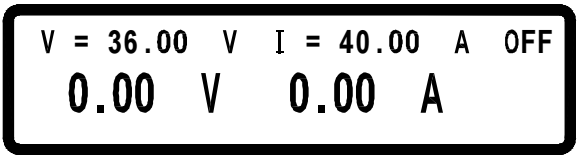
After finishing setting procedure, if a Slave receives only the output order sent by Master but not receives the synchronous signal, then it will present the following error messages. The error message “SYNC ON” is shown when the slave is not receiving the synchronous output ON signal. The error message “SYNC OFF” is shown when the slave is not receiving the synchronous output OFF signal.

5.9 External Tuning Setting

DS3640/DS6024/DS8018/DS10014 provides the capability to control the output voltages by an external voltage/resistance. The range of the external voltage is in 0 ~ 10 Vdc or 0 ~ 5 Vdc and the range of the external variable resistance is between 0 ~ 5 Kohm to control the output voltage (0 ~ 36V for DS3640 and 0 ~ 60V for DS6024 and 0 ~ 80V for DS8018 and 0 ~ 100V for DS10014) and the output current (0 ~ 40A for DS3640 and 0 ~ 24A for DS6024 and 0 ~ 18A for DS8018 and 0 ~ 14.4A for DS10014). The wirings of the external control is shown in the following figure.

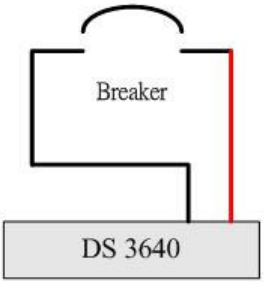


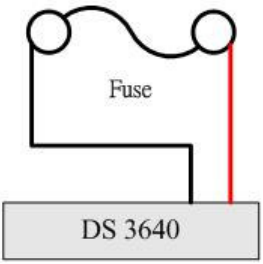
The external voltage control or external resistance control can be set in the system setting page. Since the external control circuit uses a 12bit D/A converter for 0 ~ 36V for DS3640 (or 0 ~ 60V for DS6024 or 0 ~ 80V for DS8018 or 0 ~ 100V for DS10014) output voltage and 0 ~ 40A for DS3640 (or 0 ~ 24A for DS6024 or 0 ~ 18A for DS8018 or 0 ~ 14.4A for DS10014) output current, therefore, the resolution of voltage and current will be different in response. The screen thus will show as the following picture (accuracy is 10mV):



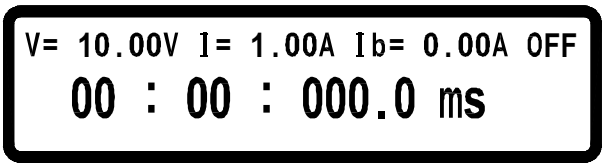
5.10 Timer of Current Flow

This function offers tests to the cutoff time of a breaker or a fuse. First, connect the test objective to output terminal as shown below.





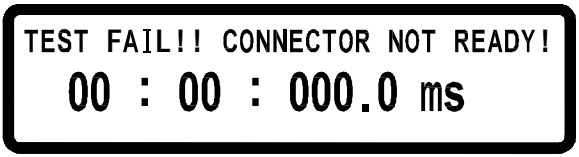
Press (Menu), (↓), (6), and then (6) in the main page to enter to the current flow counter page.



After setting up output voltage/current and press (On/Off) to output, system will start counting the timer till the breaker or fuse is open. The resolution of the timer is 100us (0.1 ms) and the maximum counting period is one hour. If counter doesn't work after pressing (On/Off), error occurs herein and screen will display error message after two seconds. one of the following three cases may happen:

A. Connector not ready

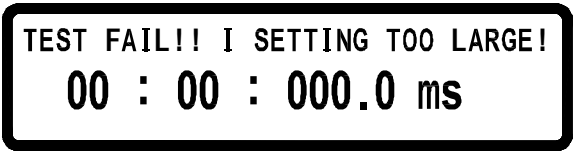
If a fuse is not properly connected to the output connector or a breaker under test has not been switched to ON position, the screen will glimmer to show an error message as shown below.



B. Current setting too large

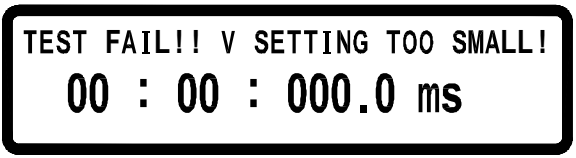
The output current is set too big that a breaker is open or a fuse is burnt to open before output current is reaching the setting value. The screen will glimmer to

show an error message as shown below.



C. Voltage setting too small

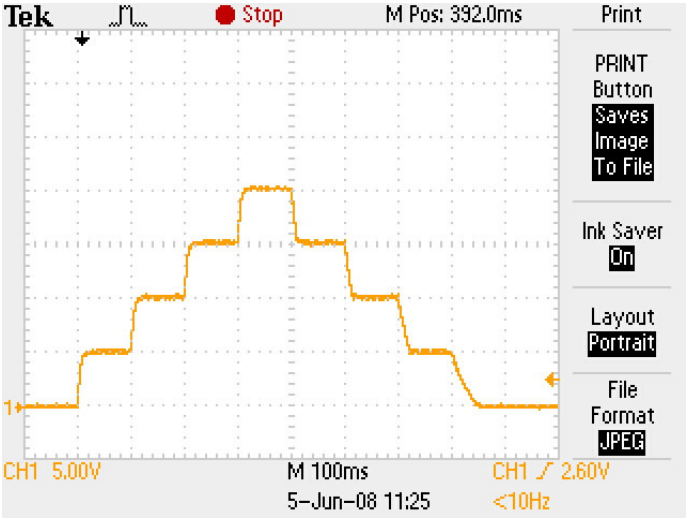
The voltage is set too small that output current is unable to reach the setting value. The screen will glimmer to show an error message as shown below.



5.11 Programmable Capability (SCPI Command Only)

DS3640/DS6024/DS8018/DS10014 provides the capability for users to program it. There are memory spaces to store 10 programs that can have 150 steps in total for setting purpose. Each program does not restrict the step quantity, however, the sum of 10 programs are restricted to 150 steps. For each program users can set up how many times to repeat the program. For each step users may be able to set up the output voltage, current, and period of time (50 ms minimum) to output the settings. Please refer to **Sec 7.5.2 (SCPI command subsystem)** for detail SCPI commands.

Example 1:

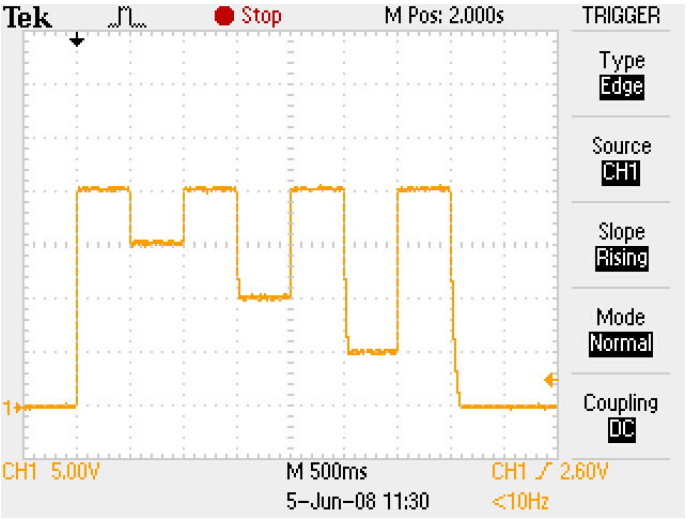


To output the wave form shown above, users may edit the program as the following orders:

PROG 1	Choose program number
PROG:CLE	Clear program 1 data
PROG:REP 0	No repeat (repeat one time for "1")
PROG:TOTA 8	Set program 1 to have 8 steps in total
PROG:STEP 1	Following 3 settings are for step 1
PROG:STEP:CURR 1	Set output current to 1 ampere
PROG:STEP:VOLT 5	Output voltage is set to 5 volts
PROG:STEP:ONT 0.1	Output ON time is set to 0.1 sec
PROG:STEP 2	Following 3 settings are for step 2
PROG:STEP:CURR 1	
PROG:STEP:VOLT 10	
PROG:STEP:ONT 0.1	
PROG:STEP 3	Choose step 3
PROG:STEP:CURR 1	
PROG:STEP:VOLT 15	
PROG:STEP:ONT 0.1	
PROG:STEP 4	Choose step 4

PROG:STEP:CURR 1	
PROG:STEP:VOLT 20	
PROG:STEP:ONT 0.1	
PROG:STEP 5	Choose step 5
PROG:STEP:CURR 1	
PROG:STEP:VOLT 15	
PROG:STEP:ONT 0.1	
PROG:STEP 6	Choose step 6
PROG:STEP:CURR 1	
PROG:STEP:ONT 0.1	
PROG:STEP 7	Choose step 7
PROG:STEP:CURR 1	
PROG:STEP:VOLT 5	
PROG:STEP:ONT 0.1	
PROG:STEP 8	Choose step 8
PROG:STEP:CURR 1	
PROG:STEP:VOLT 0	
PROG:STEP:ONT 0.1	
PROG:NEXT 0	Select next program to run after program 1 is complete, 0 means stop
PROG:SAV	After edit, use Save command to store program 1 in the hardware
PROG 1 PROG:RUN ON	To run the program stored in the hardware, it shall select program number and then use RUN ON command to execute the program.

Example 2:

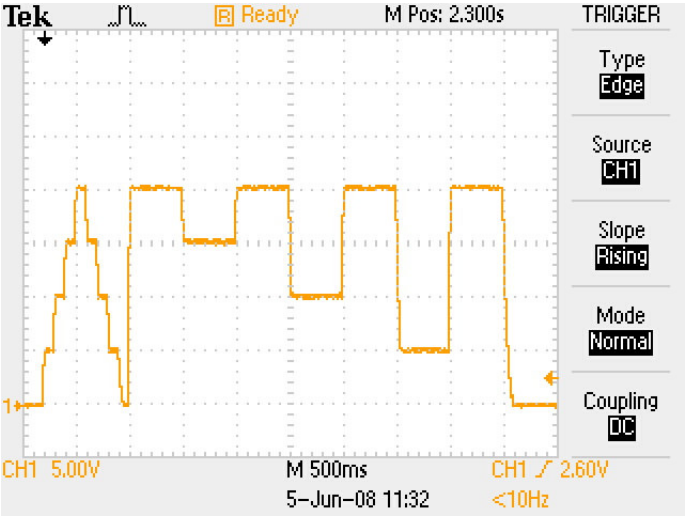


To output the wave form shown above, the following example program can be used.

PROG 2	Choose program number
PROG:CLE	Clear program 2 data
PROG:REP 0	No repeat after running this program
PROG:TOTA 8	Set program 2 to have 8 steps in total
PROG:STEP 1	Settings for step 1
PROG:STEP:CURR 2	Set output current to 2 amperes
PROG:STEP:VOLT 20	Set output voltage to 20 volts
PROG:STEP:ONT 0.5	Set output ON time to 0.5 sec
PROG:STEP 2	Choose step 2
PROG:STEP:CURR 2	
PROG:STEP:VOLT 15	
PROG:STEP:ONT 0.5	
PROG:STEP 3	Settings for step 3
PROG:STEP:CURR 2	
PROG:STEP:VOLT 20	
PROG:STEP:ONT 0.5	
PROG:STEP 4	Choose step 4
PROG:STEP:CURR 2	

PROG:STEP:VOLT 10	
PROG:STEP:ONT 0.5	
PROG:STEP 5	Choose step 5
PROG:STEP:CURR 1	
PROG:STEP:VOLT 20	
PROG:STEP:ONT 0.5	
PROG:STEP 6	Choose step 6
PROG:STEP:CURR 2	
PROG:STEP:VOLT 5	
PROG:STEP:ONT 0.5	
PROG:STEP 7	Choose step 7
PROG:STEP:CURR 2	
PROG:STEP:VOLT 20	
PROG:STEP:ONT 0.5	
PROG:STEP 8	Choose step 8
PROG:STEP:CURR 2	
PROG:STEP:VOLT 0	
PROG:STEP:ONT 0.5	
PROG:NEXT 0	Select next program to run after program 2 is complete, 0 means stop
PROG:SAV	After edit, use Save command to store program 2 in the hardware
PROG 2 PROG:RUN ON	To run the program stored in the hardware, it shall select program number and then use RUN ON command to execute the program.

Example 3:

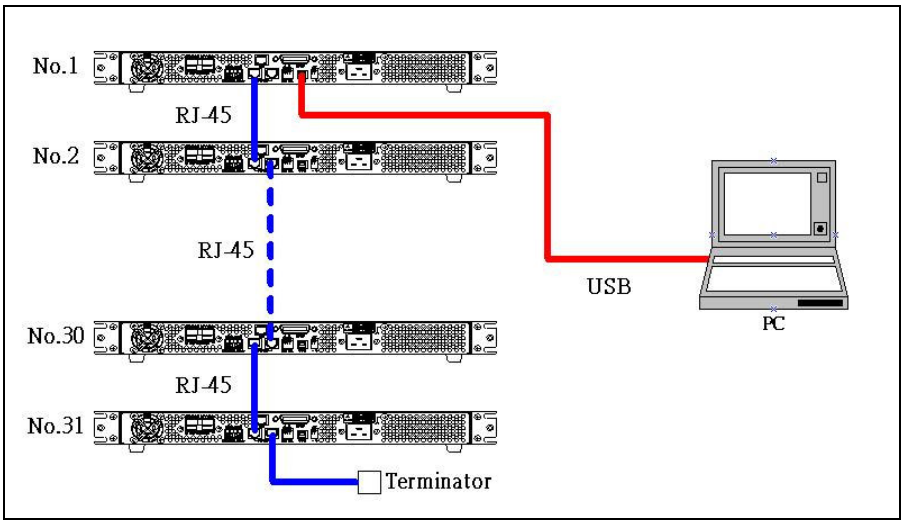


If it needs to execute Program 2 right after Program 1 is executed then program 1 shall be modified to have NEXT 2 command. The following steps can be taken for the modification and execute the programs.

PROG 1	Select program 1
PROG:NEXT 2	Change the NEXT command from NEXT 0 to NEXT 2
PROG:SAV	After edit is complete use Save command to store changes in the hardware
PROG 1 PROG:RUN ON	To run the program by selecting the program number first and then using RUN ON command to execute it.

5.12 Series Connection Function (RS485)

DS3640/DS6024/DS8018/DS10014 can use RS485 to provide multi-units series connection function for up to 31 units (If more than 10 units, please add the resistance 120Ω in the last unit as shown in the below figure. Turn on the system after series connection is completed. Press (Menu) → (9) on the main page and set CHAIN ON/OFF as ON (Series/Parallel connection will be cancelled) and set each unit with the distinct Address (1 ~ 31). Then by using USB to connect PC to any unit, multiple units can be controlled by using the commands in **Sec. 5.12.1 SERIES CONNECTION COMMAND LIST.**



5.12.1 Series Connection Command List

The series connection command used by all DS series through ASCII string and must add the ending character (0x0A) behind the string. The system will respond after every data delivers. For example, the system will respond with the corresponding value or string when delivering the inquire command, or respond "OK" when delivering the setting command. In case any errors happen, the system will respond what kind of error it is. (Please refer to **Sec. 5.12.2 ERROR RESPONSE LIST**). Command table is as below.

SYSTEM CONTROL COMMAND：

Command	**Description**
CADR	followed by address, which can be 1 to 31 and is used to access the power supply
CCLS	Clear status
CRST	Reset command. Brings the power supply to a known state
CIDN?	Returns the power supply model identification
CREV?	Returns the firmware version
CSN?	Returns the serial number
CST?	Returns the device status
CCLR?	Clear protect

OUTPUT CONTROL COMMAND：

Command	**Description**
CPV	Sets the output voltage value in Volts
CPV?	Reads the output voltage setting
CMV?	Reads the actual output voltage
CPC	Sets the output current value in Amperes
CPC?	Reads the output current setting
CMC	Reads the actual output current
CDVC?	Display voltage and current data
COUT	Turns the output to ON or OFF
COUT?	Returns the output On/Off status
COV	Sets the OVP level
COV?	Returns the OVP setting level
COVP	Sets the OVP on/off
COVP?	Returns the OVP on/off
COC	Sets the OCP level
COC?	Returns the OCP setting level

COCP	Sets the OCP on/off
COCP?	Returns the OCP on/off
COP	Sets the OPP level
COP?	Returns the OPP setting level
COPP	Sets the OPP on/off
COPP?	Returns the OPP on/off
CMODE?	Returns the power supply operation mode

==========

SYNCHRONOUS CONTROL COMMAND：

Command	**Description**
GRST	Reset command. Brings the power supply to a known state
GCLS	Clear status
GCLR	Clear protect
GPV	Sets the output voltage value in Volts
GPC	Sets the output current value in Amperes
GOUT	Turns the output to ON or OFF
GOV	Sets the OVP level
GOVP	Sets the OVP on/off
GOC	Sets the OCP level
GOCP	Sets the OCP on/off
GOP	Sets the OPP level
GOPP	Sets the OPP on/off

==========

EXAMPLES：

Q1. How to read back ID for Address 5 on the system?

CADR 5 ➔ OK
CIDN? ➔ Motech inc. DS 3640,A1234567,1.13,0

Q2. How to set up Voltage for Address 7 on the system?

CADR 7 ➔ OK
CPV 20 ➔ OK

Q3. How to set up Output for Address 7 on the system?

CADR 3 ➔ OK
COUT 1 ➔ OK

Q4. How to read back Voltage value for Address 1 on the system?

CADR 1 ➔ OK
CMV? ➔ 10.001

Q5. How to set up Current for all the systems?

GPC 5 ➔ No response

Q6. How to set up Output for all the systems?

GOUT 1 ➔ No response

5.12.2 Error Response List

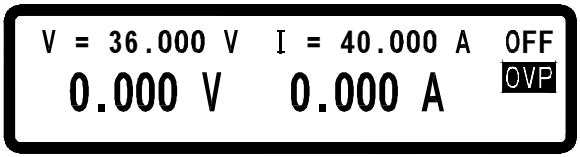
If PC delivers an error command or connection fails, the response string will be shown as below.

String	Description
OK	No error
Time out	Wait response time out
Range error	Input value is out of range
Multi master	There are more than one controller in the whole system

6. Protections and Error Messages

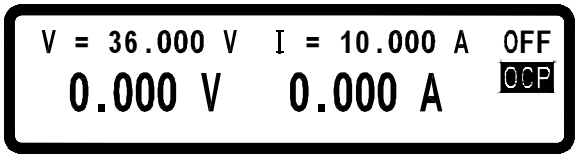
6.1 Over-voltage Protection (OVP)

When the OVP is activated and voltage measured is over the setting point of protected voltage, system will enter the "Over Voltage Protect" mode that will shut off the output and show OVP on the display. Press (Enter) to reset the protection mode and deactivate buzzer.



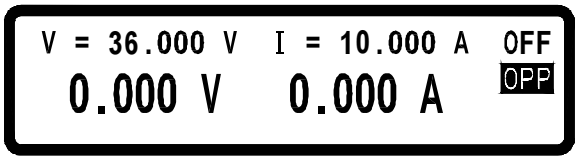
6.2 Over-current Protection (OCP)

When the OCP is activated and current measured is over the setting point of protected current, system will enter the "Over Current Protect" mode that will shut off the output and show OCP on the display. Press (Enter) to reset the protection mode and deactivate buzzer.



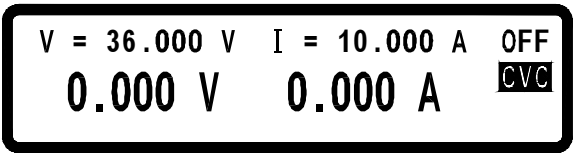
6.3 Overpower Protection (OPP)

When the OPP is activated and power measured is over the setting point of protected power, system will enter the "Over Power Protect" mode that will shut off the output and display OPP on the screen. Press (Enter) to reset the protection mode and deactivate buzzer.



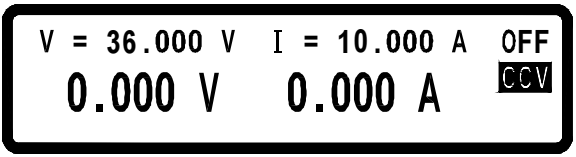
6.4 Constant Voltage Protection (CV TO CC)

When this function is activated DS3640/DS6024/DS8018/DS10014 will stay in CV mode. If load changes and forces the system turning from CV to CC (constant current) mode, system will enter the "CV TO CC Protect" that will shut off the output and display the CVC message on the screen. Press (Enter) to reset the protection and deactivate buzzer.



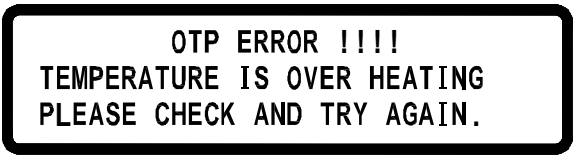
6.5 Constant Current Protection (CC TO CV)

When this function is activated DS3640/DS6024/DS8018/DS10014 will stay in the CC mode. If load forces the measurement turn from CC to CV (constant voltage) mode, system will enter the "CC TO CV Protect" that will shut off output and display CCV message on the screen. Press (Enter) to reset the protection and deactivate buzzer.



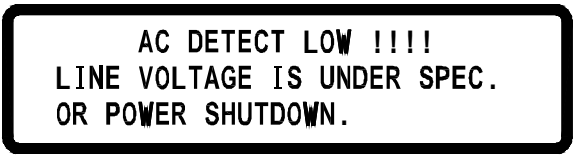
6.6 Over-temperature Protection (OTP)

When machine has detected abnormally high temperature, system will enter the "Over Temperature Protect" mode that will shut off output and display the erro message as shown in the following figure. Press (Enter) to reset the protection and deactivate buzzer.



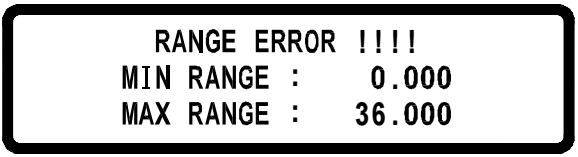
6.7 Low Voltage Protection (ACD)

When the machine has detected abnormally low AC power input, system will enter the "AC Detect Low Protect" mode that will shut off output and display the error message shown in the following figure. Press (Enter) to reset the protection and deactivate buzzer.



6.8 Error Input Message

When users enter a voltage or current setting that is beyond the acceptable range, system will display "RANGE ERROR" in response and show users the correct input range. Press (Enter) to re-enter the voltage/current setting.



7. Remote Interface communication protocol

The communication protocol includes the MOTECH commands and SCPI commands.

7.1 Prefaces

The SCPI interface enables users to operate DS3640/DS6024/DS8018/ DS10014 through a computer or terminal that has IEEE-488.2 GPIB or USB interface equipped. And it allows carrying out remote control and monitoring.

SCPI IEEE-488.2 version supports multi units control capability that allows a user to control up to 32 DS3640/DS6024/DS8018/DS10014 units.

7.2 Parameters Definition

Type	Valid Arguments
<boolean >	" ON" or 1, " OFF" or 0
<NR1 >	The data format <NR1> is defined in IEEE-488.2 for integers. Zero, positive and negative integer numeric values are valid data.
<NRf >	**The data format <NRf> is defined in IEEE-488.2 for flexible Numeric Representation. Zero, positive and negative floating-point numeric values are some examples of valid data.**
<string >	Characters enclosed by single or double quotes
<NL >	New line, Hex code is 0x0Ah
<Rtn >	Return, Hex code is 0x0Dh
<END >	End or identify

Note: All commands shall be ended with the <Rtn> and <NL>. And there shall be a space between the command and the parameter. For example, to set the GPIB address of 10 to a DS3640/DS6024/DS8018/DS10014. The command line is as follows:

ADDR 10<Rtn><NL >

Note: The<NL> and<Rtn> are not presented in the following examples and command descriptions. However, users shall add them to the end of each command when doing the coding.

7.3 The Error/Event List

SCPI interface can offer an error/event list that contains up to 10 errors/events. We can read the errors/events through the "**error?**" command in a first-in first-out manner. Once an error/event is read, the read process will clean it from the memory. To clean all errors/events from the memory, the "***CLS**" command can be used.

Error	Description
-000	No error
-001	Command error
-002	Execution error
-003	Query error
-004	Input Range error
-005	Parallel/Series function, Error mode
-006	Parallel/Series function, Multi-Master
-007	Parallel/Series function, No Slave found
-008	Parallel/Series function, Communication with Slave A error
-009	Parallel/Series function, Communication with Slave B error
-010	Parallel/Series function, Communication with Slave C error
-011	Parallel/Series function, Sync. signal error when output on
-012	Parallel/Series function, Sync. signal error when output off

7.4 Compatible Protocol of MOTECH LPS & PPS Product Family

Command	Description
ADDRess	set the address of the machine
ADDRess?	return the address of the machine
BEEP	set beep on(1) or off(0)
CLR	clear protect status
CURRent	set current
CURRent?	return current setting
ERRor?	return error message
IOUT?	current readback
ISET	set current
ISET?	return current setting
LOCK	set rotary and keypad lock on(1) or off(0)
MODEL?	return model name
OCP	set current protect to off(0) or on(1)
OISET	set overcurrent protect level
OISET?	return overcurrent value
OPP	set power protect to off(0) or on(1)
OPSET	set overpower protect level
OPSET?	Return overpower value
OUT	set output on(1) or off(0)
OVP	set voltage protect to off(0) or on(1)
OVSET	set overvoltage protect level
OVSET?	return overvoltage value
STATUS?	return status of the machine
VERsion?	return version number
VOLTage	set voltage
VOLTage?	return voltage setting
VOUT?	voltage readback
VSET	Set up output voltage
VSET?	return voltage setting

Examples:

Q 1:How to set GPIB address?

ADDR 10 ==>address is 10

Q 2:How to read back GPIB address?

ADDR? ==>return GPIB address

ADDRESS? ==>return GPIB address

Q 3:How to set up buzzer?

BEEP 1 ==>trigger beep to on

BEEP off ==>trigger beep to off

Q 4:How to clear the protecting state?

CLR ==>clear protect status

Q 5:How to read back to error information?

ERR? ==>return error code

Q 6:How to set up voltage?

VSET 10 ==>set voltage to 10V

VOLT 3.3V ==>set voltage to 3.3V

VOLTAGE 45 ==>set voltage to 45V (for DS6024)

Q 7:How to read the voltage setting value?

VSET? ==>return voltage setting

VOLT? ==>return voltage setting

VOLTAGE? ==>return voltage setting

Q 8:How to set up current?

ISET 1.1 ==>set current to 1.1A

CURR 4.3022 ==>set current to 4.3022A

CURRENT 0.250 ==>set current to 250mA

Q 9:How to read the setting value of current?

ISET? ==>return current setting

CURR? ==>return current setting

CURRENT? ==>return current setting

Q 10:How to read the voltage outputting value?

VOUT? ==>return voltage output

Q 11:How to read the current outputting value?

IOUT? ==>return current output

Q 12:How to lock buttons and the knob controller?

LOCK 1 ==>lock the keypad and knob

LOCK ON ==>lock the keypad and knob

Q 13:How to read the product model number?

MODEL? ==>return machine model name

Q 14:How to set up OVP function?

OVP 1 ==>enable OVP protect

OVP OFF ==>disable OVP protect

Q 15:How to set up OVP voltage value?

OVSET 38 ==>set OVP level to 38 V

Q 16:How to set up OCP function?

OCP 1 ==>enable OCP protect

OCP OFF ==>disable OCP protect

Q 17:How to set up OCP electric current value?

OISET 40 ==>set OCP level to 40 A

Q18:How to set up OPP function?

OPP 1 ==>enable OPP protect

OPP OFF ==>disable OPP protect

Q 19:How to set up OPP power value?

OPSET 1000 ==>set OPP level to 1000 W

Q 20:How to set up output?

OUT 1 ==>output on

OUT OFF ==>output off

Q 21:How to read state value?

STATUS? ==>return status value

Q 22:How to read the firmware version?

VER? ==>return version information

VERSION? ==>return version information

7.5 SCPI Conformable Information

SCPI is entirely compatible with all IEEE-488.2 and SCPI commands (1995). Commands are included in SCPI commands (in Vol. 2, 1995).

7.5.1 Common SCPI commands

Command	Explanation
*CLS	Clear status (include error code)
*IDN?	Response:<Manufacturer>, <model>, <serial number>, <firmware type, & version >
*RCL	Recalls settings from memory. Memory numbers from 0 to 9 are valid.
*RST	Resets the power supply to its power on state.
*SAV	1. Saves defined parameters 2. Saves current settings to memory. Memory numbers from 0 to 9 are valid.

Examples:

Q 23:How to store the voltage/current settings to memory devices?

*SAV 5 ==>save current settings to memory location 5

Q 24:How to recall the voltage/current settings from memory devices?

*RCL 3 ==>recall setting from memory location 3

Q 25:How to set up software reset?

*RST

Q 26:How to identify the instrument's model number?

*IDN?

Q 27:How to clear error message?

*CLS

7.5.2 SCPI Command subsystem

ABORt	Abort the Output Action
FETCh	**Fetch Subsystem**
:CURRent?	Return the fetched output current
:VOLTage?	Return the fetched output voltage
MEASure	**Measure subsystem**
:CURRent?	Return the measured output current
:VOLTage?	Return the measured output voltage
MEMory	**Memory Subsystem**
<NR1 | ? >	select or return memory number, range from 0 ~ 9
:VSET <NRf | ? >	set or return voltage:0~36V/0~60V
:ISET <NRf | ? >	set or return current:0~40A/0~24A
:SAVE	store memory subsystem parameters
OUTput	**Output Subsystem**
<Boolean >	enable or disable output action
?	return output state
:LIMit	
:VOLTage <NRf | ? >	set or return voltage limit value
:CURRent <NRf | ? >	set or return current limit value
:STATe?	Return output mode (CV or CC)
:PROTection	
:CLEar	Reset latched protection
PROGram	**Program Subsystem**
<NR1 | ? >	select or return memory number, range from 1 ~ 10

:CLEar	clear program n parameters
:ALL	clear all program parameters
:NEXT <NR1 | ? >	ser or return next program number (1 ~ 10 , 0 for end)
:REPeat <NR1 | ? >	set or return repeat times (max. 50000)
:RUN<Boolean | ? >	set or query program on/off state
:SAV	save program parameters
:STEP < Boolean | ? >	set or return step number
:CURRent <NRf | ? >	set or return step n current setting
:ONTimet <NRf | ? >	set or return step n output time (0.050 ~ 20000S)
:VOLTage <NRf | ? >	set or return step n voltage setting
:TOTA[l] <NR1 | ? >	set or return program n total step numbers (max. 150)

PROTection **Protection Subsystem**

?	return protect state
:CCCV <Boolean | ? >	set or return CC to CV protect state
:CLEar	Resets latched protection
:CVCC <Boolean | ? >	set or return CV to CC protect state
:OCP <Boolean | ? >	set or return over-current protect state
:LEVel <NRf | ? >	set or return over-current protect value
:OPP <Boolean | ? >	set or return over-power protect state
:LEVel <NRf | ? >	set or return over-power protect value
:OVP <Boolean | ? >	set or return over-voltage protect state
:LEVel <NRF | ? >	set or return over-voltage protect value

PS **Parallel/Series Subsystem**

:MODE <OFF/0,PARALLEL/1,SERIES/2|? >

set or return parallel/series mode

:TYPE <MASTER/0,SLAVEA/1,SLAVEB/2,SLAVEC/3|?>

set or return master/slave setting

[SOURce] **Source Subsystem**

:CURRent <NRf | ? > set or return current level:0~40/0~24A

:PROTection <Boolean | ? >

set or return over-current state

:LEVel <NRf | ? > set or return over-current level

:VOLTage <NRf | ? > set or return voltage level:0~36/0~60V

:PROTection <Boolean | ? >

set or return over-voltage state

:LEVel <NRf | ? > set or return over-voltage level

SYStem **System Subsystem**

:BEEP <Boolean | ? > set or return BEEP state

:E5V <Boolean | ? > enable or disable extra 5V output

:ERRor? return system error

:EXTernal<OFF/0,VOLT/1,RES/2 | ? >

set or return external state

:GPIB

:ADDRess <NR1 | ? > set or return GPIB address (1~31)

:IP

:ADDRess <NR1.NR1.NR1.NR1 | ? >

set or return IP address

:CONFig <STATic/0,DHCP/1 | ? >

set or return IP config mode

:KEY

:LOCK <Boolean | ? set or return key lock state

:LCD

:BL <Boolean | ? >	set or return LCD backlight state
:POWer	
:CURRent <NRf | ? >	set or return user define current level
:STATe <Boolean | ? >	set or return user define output state
:TYPE <OFF/0,LAST/1,USER/2 | ? >	set or return power up mode
:VOLTage <NRf | ? >	set or return user define voltage level
:RECall	
:DEFault	recall factory default setting
:REMote <USB/0,GPIB/1,ETHERNET/2 | ? >	set or return remote interface
:SERies?	Return series number

TIMER **Timer Subsystem**

<Boolean >	enable or disable timer mode
?	return timer state
:HOUR<NR1 | ? >	set or return timer hours
:MINute<NR1 | ? >	set or return timer minutes
:SECond<NR1 | ? >	set or return timer seconds

Examples:

Q 28:How to cancel all actions?
ABOR
ABORT

Q 29:How to fetch current value?
FETC:CURR?
FETCH:CURRENT?

Q 30:How to fetch voltage value?
FETC:VOLT?
FETCH:VOLTAGE?

Q 31:How to measure current?
MEAS:CURR?
MEASURE:CURRENT?

Q 32:How to measure voltage?
MEAS:VOLT?
MEASURE:VOLTAGE?

Q 33:How to set up and read back the specific memory set?
MEM 1
MEMORY 3
MEM?
MEMORY?

Q 34:How to set up and read back the voltage stored in specific memory set?
MEM:VSET 10
MEM:VSET?
MEMORY:VSET 20
MEMORY:VSET?

Q 35:How to set up and read back the current stored in specific memory set?
MEM:ISET 15
MEM:ISET?
MEMORY:ISET 25

MEMORY:ISET?

Q 36:How to save data to memory set?
MEM:SAVE
MEMORY:SAVE

Q 37:How to set up and cancel output?
OUT ON
OUTPUT 0

Q 38:How to set up and read back the voltage limit?
OUT:LIM:VOLT 30
OUT:LIM:VOLT?
OUTPUT:LIMIT:VOLTAGE 35
OUTPUT:LIMIT:VOLTAGE?

Q 39:How to set up and read back the current limit?
OUT:LIM:CURR 30
OUT:LIM:CURR?
OUTPUT:LIMIT:CURRENT 35
OUTPUT:LIMIT:CURRENT?

Q 40:How to set up and read back the voltage SLEW RATE?
OUT:SR:VOLT 2.4
OUT:SR:VOLT?
OUTPUT:SR:VOLTAGE 0.01
OUTPUT:SR:VOLTAGE?

Q 41:How to set up and read back the current SLEW RATE?
OUT:SR:CURR 2.5
OUT:SR:CURR?
OUTPUT:SR:CURRENT 0.01
OUTPUT:SR:CURRENT?

Q 42:How to read back the output state?
OUT:STAT?
OUTPUT:STATE?

Q 43:How to read back the protection state?
PROT?

PROTECTION?

Q 44:How to set up and read back the CC to CV protection state?
PROT:CCCV ON
PROT:CCCV?
PROTECTION:CCCV 0
PROTECTION:CCCV?

Q 45:How to set up and read back the CV to CC protection state?
PROT:CVCC ON
PROT:CVCC?
PROTECTION:CVCC 0
PROTECTION:CVCC?

Q 46:How to clear the state of protection?
PROT:CLE
PROTECTION:CLEAR
OUT:PROT:CLE
OUTPUT:PROTECTION:CLEAR

Q 47:How to set up and read back the overcurrent protection state?
PROT:OCP ON
PROT:OCP?
PROTECTION:OCP 0
PROTECTION:OCP?
SOUR:CURR:PROT ON
SOUR:CURR:PROT?
SOURCE:CURRENT:PROTECTION 0
SOURCE:CURRENT:PROTECTION?

Q 48:How to set up and read back the overcurrent protection point?
PROT:OCP:LEV 30
PROT:OCP:LEV?
PROTECTION:OCP:LEVEL 40
PROTECTION:OCP:LEVEL?
SOUR:CURR:PROT:LEV 25
SOUR:CURR:PROT:LEV?
SOURCE:CURRENT:PROTECTION:LEVEL 35
SOURCE:CURRENT:PROTECTION:LEVEL?

Q 49:How to set up and read back the overpower protection state?
PROT:OPP ON
PROT:OPP?
PROTECTION:OPP 0
PROTECTION:OPP?

Q 50:How to set up and read back the overpower protection point?
PROT:OPP:LEV 30
PROT:OPP:LEV?
PROTECTION:OPP:LEVEL 40
PROTECTION:OPP:LEVEL?

Q 51:How to set up and read back the overvoltage protection state?
PROT:OVP ON
PROT:OVP?
PROTECTION:OVP 0
PROTECTION:OVP?
SOUR:VOLT:PROT ON
SOUR:VOLT:PROT?
SOURCE:VOLTAGE:PROTECTION 0
SOURCE:VOLTAGE:PROTECTION ?

Q 52:How to set up and read back the overvoltage protection point?
PROT:OVP:LEV 30
PROT:OVP:LEV?
PROTECTION:OVP:LEVEL 40
PROTECTION:OVP:LEVEL?
SOUR:VOLT:PROT:LEV 25
SOUR:VOLT:PROT:LEV?
SOURCE:VOLTAGE:PROTECTION:LEVEL 35
SOURCE:VOLTAGE:PROTECTION:LEVEL?

Q 53:How to set up the buzzer?
SYS:BEEP ON
SYSTEM:BEEP 0

Q 54:How to set up the extra 5V voltage output?
SYS:E5V ON
SYSTEM:E5V 0

Q 55:How to read back error code?
SYS:ERR?
SYSTEM:ERROR?

Q 56:How to set up and read back the external adjustment state?
SYS:EXT VOLT
SYS:EXT?
SYSTEM:EXTERNAL RESISTANCE
SYSTEM:EXTERNAL?

Q 57:How to set up and read back the GPIB address?
SYS:GPIB:ADDR 5
SYS:GPIB:ADDR?
SYSTEM:GPIB:ADDRESS 6
SYSTEM:GPIB:ADDRESS?

Q 58:How to set up and read back the IP address?
SYS:IP:ADDR 192.168.0.208
SYS:IP:ADDR?
SYSTEM:IP:ADDRESS 192.168.10.10
SYSTEM:IP:ADDRESS?

Q 59:How to set up and read back the IP mode?
SYS:IP:CONF DHCP
SYS:IP:CONF?
SYSTEM:IP:CONFIG STATIC
SYSTEM:IP:CONFIG**?**

Q 60:How to set up and read back the key locking?
SYS:KEY:LOCK ON
SYSTEM:KEY:LOCK?

Q 61:How to set up and read back the LCD backlighting function?
SYS:LCD:BL ON
SYSTEM:LCD:BL?

Q 62:How to set up and read back the booting mode?
SYS:POW:TYPE LAST
SYS:POW:TYPE?
SYS:POWER:TYPE USER

SYS:POWER:TYPE?
SYSTEM:GPIB:ADDRESS?

Q 63:How to set up and read back the voltage under user-defined booting mode?
SYS:POW:VOLT 10
SYS:POW:VOLT?
SYSTEM:POWER:VOLTAGE 20
SYSTEM:POWER:VOLTAGE?

Q 64:How to set up and read back the current under user-defined booting mode?
SYS:POW:CURR 10
SYS:POW:CURR?
SYSTEM:POWER:CURRENT 20
SYSTEM:POWER:CURRENT?

Q 65:How to set up and read back the output state under user-defined booting mode?
SYS:POW:STAT ON
SYS:POW:STAT?
SYSTEM:POWER:STATE 0
SYSTEM:POWER:STATE?

Q 66:How to recall back default setting?
SYS:REC:DEF
SYSTEM:RECALL:DEFAULT

Q 67:How to set up and read back the communication interface?
SYS:REM GPIB
SYS:REM?
SYSTEM:REMOTE ETHERNET
SYSTEM:REMOTE**?**

Q 68:How to read back the SERIES NUMBER?
SYS:SER?
SYSTEM:SERIES?

Q 69:How to set up and read back the output voltage?
SOUR:VOLT 30

SOUR:VOLT?
SOURCE:VOLTAGE 35
SOURCE:VOLTAGE?

Q 70:How to set up and read back the output current?
SOUR:CURR 40
SOUR:CURR?
SOURCE:CURRENT 35
SOURCE:CURRENT?

Q 71:How to set up and read back parallel/series mode?

PS:MODE PARALLEL
PS:MODE?
PS:MODE 2
PS:MODE OFF

Q 72:How to set up and read back master/slave in parallel/series mode?

PS:TYPE MASTER
PS:MODE?
PS:MODE SLAVEB
PS:MODE 3

Q 73:How to set up Program function?

Refer to Sec 5.11 (Programmable capability).

7.6 State Bit Definition

When "**STATE?"** command is used, the system will return three (3) bytes in the order as shown below.

Byte 2	Byte 1	Byte 0
bit 7 ~ bit 0	bit 7 ~ bit 0	bit 7 ~ bit 0

The definition of each bit is described in the following table.

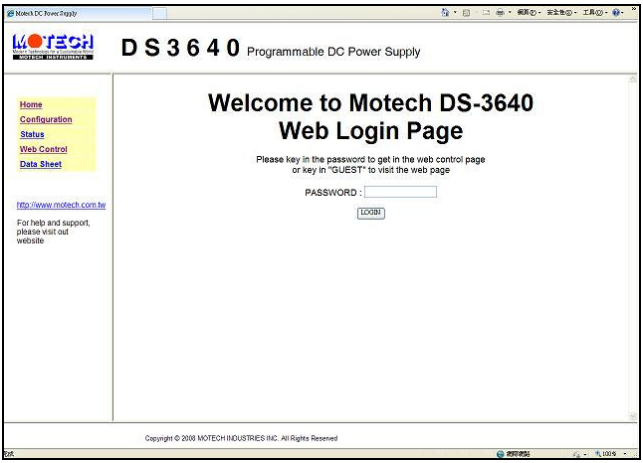
byte 0:	bit 7	OVP on/off status
	bit 6	OCP on/off status
	bit 5	OPP on/off status
	bit 4	CC to CV on/off status
	bit 3	CV to CC on/off status
	bit 2	output on/off status
	bit 1	LCD back light on/off status
	bit 0	External 5V output on/off status
byte 1:	bit 7	OVP occur flag
	bit 6	OCP occur flag
	bit 5	OPP occur flag
	bit 4	CC to CV occur flag
	bit 3	CV to CC occur flag
	bit 2	AC dectect low occur flag
	bit 1	OTP occur flag
	bit 0	reserved
byte 2:	bit 7 ~ 0	reserved

7.7 LAN Communction

All DS series provide three LAN control modes, including Web server, Telnet and Sockets. First, enter the first Item "System Setting" on the menu to set the interface selection (Remote Control) as Ethernet, and select IP setting procedure as Static or use DHCP (Dynamic Host Configuration Protocol). If using static IP, it needs to set up IP address. After completed, it will be able to use the above LAN control mode to control the DS series.

7.7.1 Using Web Server

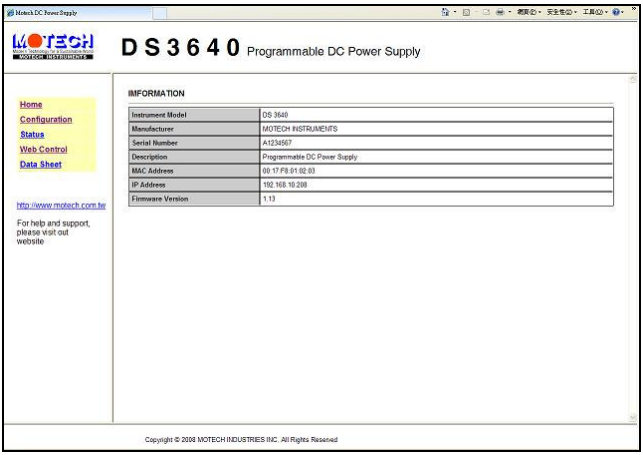
All DS series have built-in Web Server. User can control the DS series on the computer by using the Web browser. Open Web browser and input IP address to enter Welcome page.


DS3640 Programmable DC Power Supply
Home
Configuration
Status
Web Control
Data Sheet
http://www.motech.com.tw
For help and support, please visit out website
Welcome to Motech DS-3640
Web Login Page
Please key in the password to get in the web control page
or key in "GUEST" to visit the web page
PASSWORD :
LOGIN
Copyright © 2008 MOTECH INDUSTRIES INC. All Rights Reserved

Enter password (presetted as 123456) to login the main page (Home), and then click to select the Items on the left side to the other settings or control page.

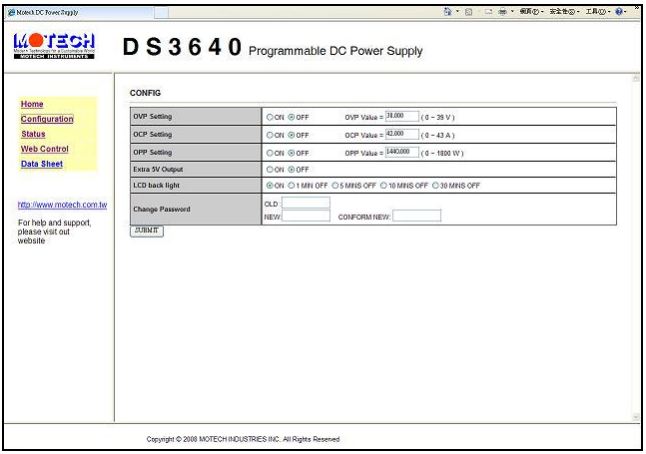
7.7.1.1 Main Page (Home)

The main page shows all the basic message and network information.



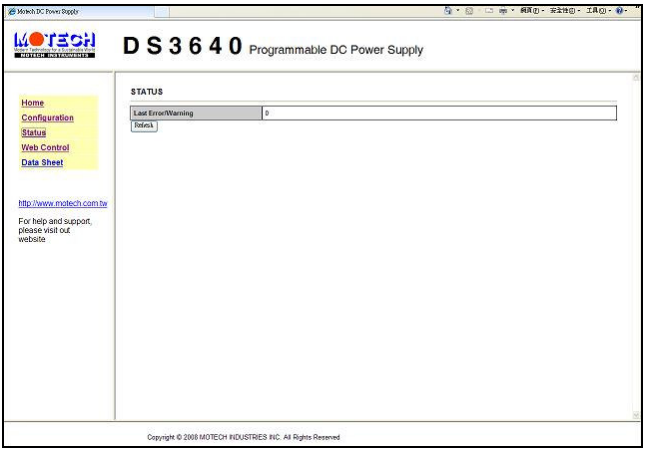
7.7.1.2 Setting Page (Configuration)

Input each argument and reset password for the system.



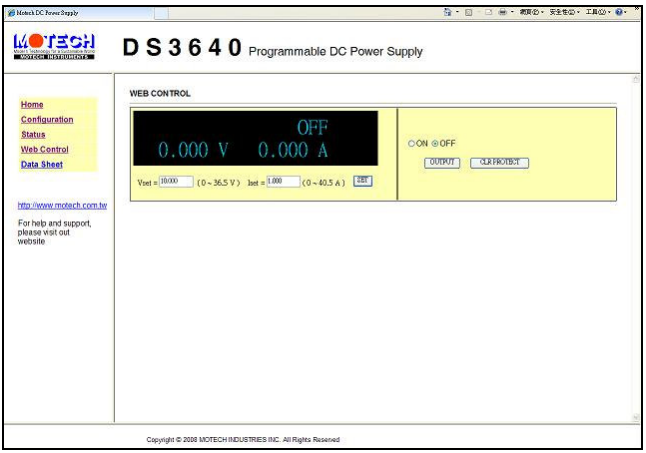
7.7.1.3 Status of Page (Status)

Display the status of the system. In case of any error codes, please refer to **Sec. 7.3 Error/Event list**



7.7.1.4 Web Control

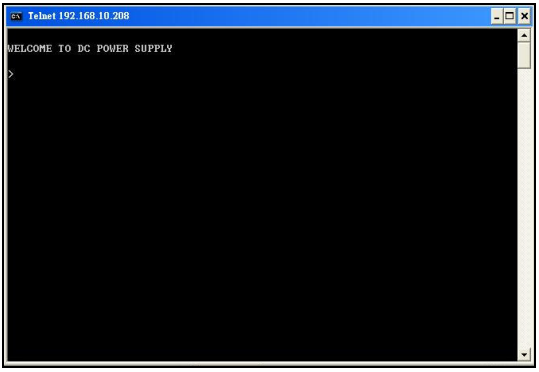
Set up voltage/current and output. In addition, monitoring the output voltage/current value on line is also allowed (JAVA support is required.).



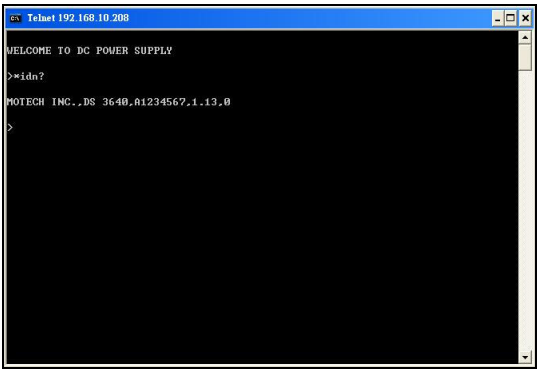
7.7.2 Using Telnet

Enter behind the command prompt under MS-DOS：Telnet DeviceIP 5024 (IP address of the system is Device IP 5024 is as Telnet port) will into

Welcome page shown as below：



Input SCPI command behind the command prompt to communicate with the system.



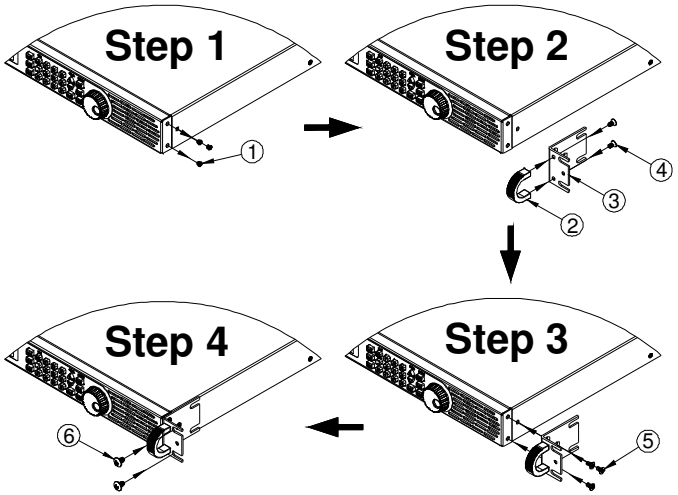
7.7.3 Using Sockets

All DS series using port 5025 to provide the standard function of SCPI socket. Users can give SCPI command to achieve the purpose of controlling the systems through users' program by using the standard SCPI socket.

8. Assemble Accessories

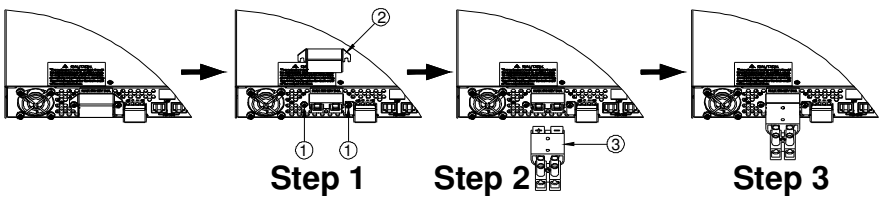
8.1 Assemble Rack Mount Brackets

The DS3640/DS6024/DS8018/DS10014 is designed to fit in a space of one rack unit (1U) and can be mounted in a standard 19-inch rack panel or cabinet. Rack mount brackets shall be assembled before mount in a rack. Refer to the following figure to assemble the rack mount brackets.



8.2 Assembly of Output Protective Shield (DS6024/DS8018/DS10014)

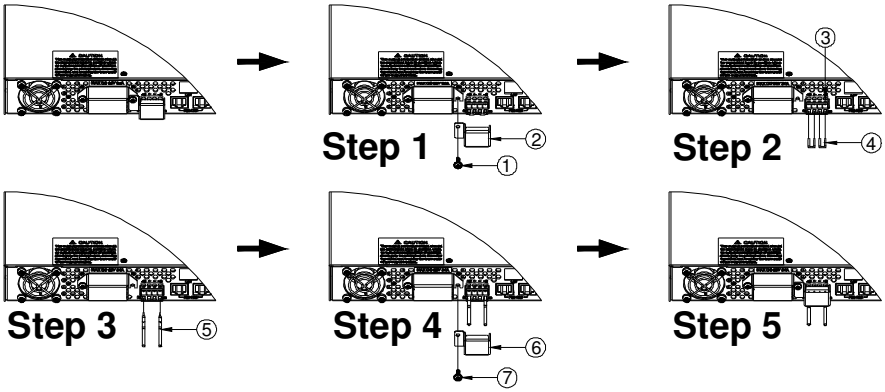
Safety regulation requests protective shield when the output voltage is higher than 45Vdc. Therefore, there are protective shields for the output connectors for the DS6024/DS8018/DS10014. Refer to the following figure for the assembly/disassembly of the output protective shield.



8.3 Assembly of Remote Sense Protective Shield

(DS6024/DS8018/DS10014)

Safety regulation requests protective shield when the voltage is higher than 45Vdc. Therefore, there are protective shields for the remote sense connectors for the DS6024/DS8018/DS10014. Refer to the following figure for the assembly/disassembly of the remote sense protective shield.



9. Accessories

Product Name:DS3640/DS6024/DS8018/DS10014

Parts List:

Item	Name & Specification	Qty	Remarks
1.	Terminal Block for Rapid Plug Connector	1	
2.	Fixing sheet (slice)	2	
3.	Hand-holding bar	2	
4.	Operation Manual	1	
5.	Power Cord	1	
6.	Screw(M4x8)	10	
7.	Screw(M5x8)	4	
8.	Guarantee certificate	1	

WARNING:
All parts of this product are safety-certified that can satisfy wide applications under the specified specification. Users should thoroughly read over this Manual and follow the instructions to use them. For example, when changing side fasteners, users should pay attention on the correct information regarding the order, screw amount and respective lengths, etc., to ensure for a correct installation rather than making any mistake in assembly that would jeopardize user's rights and interests of warranty service.

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ZOMG-3640ME-2